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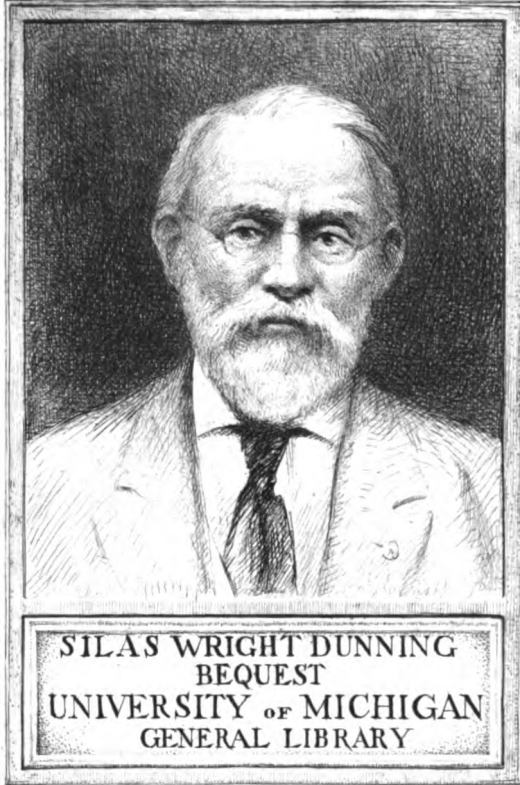
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# Journal of the United Service Institution of India.

VOL. XXIX—1900.

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LIST OF MEMBERS.

On 1st January 1900.

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*Viceroy and Governor General of India.*

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*Commanding the Forces, Madras.*

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*Commanding the Forces, Bombay.*

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## LIFE MEMBERS.

Rank.	Name.	Corps, &c.
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Major ...	Bond, W. J. H. ...	Asst. Commissary-Genl.
Captain, D.S.O. ...	Bowker, W. J. ...	Somersetshire L. I.
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General ...	Browne, H. R. ...	Retired.
Colonel ...	Bruce, E. A. ...	Retired.
Captain ...	Bruce, J. E. L. ...	R. A.
Captain ...	Budd, N. A. H. ...	12th Bombay Infantry.
Major ...	Cadell, A. ...	38th Bengal Infantry.
Captain ...	Campbell, A. A. E. ...	25th Punjab Infantry.
Captain ...	Campbell, A. J. ...	26th Madras Infantry.
Lt.-Colonel ...	Carter, F. C. ...	Royal Berkshire Regt.
Captain ...	Cockerill, G. K. ...	28th Punjab Infantry.
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Colonel ...	Cologan, J. F. F. G. ...	Staff Corps.
Lt.-Colonel, H. H. Bahadur, G.C.I.E., C.B.	Cooch Behar, Maharaja Sir Nripendra Narayan of— ...	6th Bengal Cavalry.
Captain ...	Cooper, W. G. ...	4th Bombay Cavalry.

## LIFE MEMBERS—continued.

Rank.	Name.	Corps, &c.
Lieutenant ...	Davidson, Houston, C. E. D.	5th Punjab Infantry.
Colonel, D.S.O. ...	Deshon, C. J. ...	Late R. A.
Captain ...	Dewing, R. H. ...	16th Madras Infantry.
Colonel, C.B., C.I.E.	Durand, A. G. A. ...	C. I. Horse.
Lt.-Col., <i>Bart</i> , C.B.	Durand, Sir E. L. ...	I. S. Corps.
Major ...	Eardley-Wilmet, A. ...	R. A.
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Major ...	Egerton, R. G. ...	"Q. O." Corps of Guides.
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Lt.-Colonel ...	Gowan, W. E. ...	Retired.
Colonel ...	Graves, S. H. P. ...	A. A. General.



## LIFE MEMBERS—continued.

Rank.	Name.	Corps, &c.
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Lieutenant ...	Lee, A. W. H. ...	16th Madras Infantry.
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Major ...	Mereer, H. F. ...	R. A.
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## LIFE MEMBERS—continued.

Rank.	Name.	Corps, &c.
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Major, Nawab, Afser-i-Jang, Afsaruddula Bahadur, C.I.E.	Muhammad Ali Beg ...	3rd Lancers, H. C.
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Captain ...	Pilleau, A. L. ...	3rd Bombay Infantry.
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Captain ...	Scharlieb, W. K. ...	5th Bengal Cavalry.

**LIFE MEMBERS**—concluded.

Rank.		Name.		Corps, &c.
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Lt.-General, K.C.B., A.-D.-C.		Stewart, Sir R. C.	...	.....
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Captain	...	Vaughan, E. G.	...	D. A. C. General.
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Major	...	Williams, G.	...	R. E.
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Colonel	...	Wilson, C. W. H.	...	Retired.
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Captain	...	Younghusband, L. N...		19th Bengal Lancers.



**ORDINARY MEMBERS.**

<b>Rank.</b>		<b>Name.</b>		<b>Corps, &amp;c.</b>
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Captain	...	Agnew, Q. G. K.	...	Royal Scots Fus.
The Hon'ble, M.A.	...	Aikman, R. S.	...	C. S.
Major	...	Aitken, A. E.	...	D. A. A. General.
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Major	...	Alexander, R. S.	...	7th Bengal Cavalry.
Major	...	Allen, A. J. W.	...	A. A. General.
Major	...	Allen, R. F.	...	R. E.
Major	...	Allen, W. H.	...	Asst. Comy.-General.
Captain	...	Allen, W. J. B.	...	R. A.
Lieutenant	...	Allgood, B.	...	Royal Irish Rifles.
Captain	...	Anderson, C. C.	...	26th Punjab Infantry.
Major	...	Anderson, J. H. A.	...	2nd Manchester Regt.
Major	...	Angelo, F. W. P.	...	9th Bengal Lancers.
Lieutenant	...	Annesley, J. H. A.	...	18th Hussars.
Major	...	Aplin, P. J. H.	...	7th Bombay Infantry.

## ORDINARY MEMBERS—continued.

Rank.		Name.		Corps, &c.
Captain	...	Archer, C.	...	Dy. Commissioner.
Captain	...	Armstrong, J. O.	...	Royal Inniskilling Fus.
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Lieutenant	...	Balfour, P.	...	Highland L. I.
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Captain	...	Banbury, W. E.	...	25th Madras Infantry.
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## ORDINARY MEMBERS—continued.

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Captain ...	Barton, F. J. H.	"Q. O." Corps of Guides
Captain ...	Basevi, W. H. F.	31st Madras Infantry.
Reverend ...	Bateson, J. H.	.....
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Captain ...	Batten, F. G.	1st Madras Pioneers.
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Major, D.S.O. ...	Bayly, A. W. L.	Asst. Adjt. General.
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Major ...	Beale, A.	5th Bombay Infantry.
Captain ...	Beames, D.	19th Punjab Infantry.
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Lt.-Colonel, C.B....	Beatson, S. B.	11th Bengal Lancers.
Captain ...	Beatty, L. N.	A.-D.-C. to H. E. the C.- in-C.
Esquire ...	Becher, A. R.	Acctt.-Genl., P. W. D.
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Major ...	Bell-Irving, A.	R. A.
Major ...	Bellers, E. V.	Middlesex Regiment.
Maj.-Genl., C.B....	Bengough, H. M.	Retired.

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Major ...	Beresford, W. R. H. ...	D. A. A. G. for Instn.
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Captain ...	Bethune, H. A. ...	Gordon Highlanders.
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Major ...	Bewicke-Copley, R. C. A. B.	King's Royal R. Corps.
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Major ...	Biddulph, S. F. ...	19th Bengal Lancers.
Major, D.S.O. ...	Biggs, H. V. ...	R. E.
Captain ...	Bingley, A. H. ...	7th Bengal Infantry.
Lt.-Genl., K.C.I.E., C.B.	Bird, Sir G. C. ...	I. S. Corps.
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Lt.-Colonel ...	Birdwood, W. S. ...	10th Bombay Infantry.
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Major ...	Blane, O. F. ...	R. A.
Captain ...	Bliss, L. H. P. ...	Duke of Cornwall's L. I.
Maj.-Genl., K.C.B.	Blood, Sir B. ...	Comdg. Meerut Dist.

## ORDINARY MEMBERS—continued.

Rank.		Name.		Corps, &c.
Major	...	Blood, W. P.	...	2nd Royal Irish Fus.
Major	...	Blyth, H. R.	...	Royal Warwick. Regt.
Captain	...	Boddam, E. B. C.	...	2-5th Gurkha Rifles.
Captain	...	Boileau, F. R. F.	...	R. E.
Major	...	Bond, F. G.	...	R. E.
Captain	...	Bonham-Carter, H.	...	R. E.
Major, D.S.O.	...	Borradaile, H. B.	...	32nd Pioneers.
Lt.-Colonel	...	Borton, A. C.	...	U. Active List.
Captain	...	Bosanquet, J. T. I.	...	2nd Border Regt.
Captain	...	Boulnois, W. A.	...	R. A.
Major	...	Bower, H.	...	17th Bengal Cavalry.
Major	...	Bowes, W. H.	...	D. A. A. General.
Colonel, C.S.I.	...	Brackenbury, M. C.	...	R. E.
Captain	...	Bradley, H. V.	...	2-2nd Gurkha Rifles.
Captain	...	Bradshaw, F. E.	...	Asst. Commissioner.
Lt.-Colonel	...	Bradshaw, L. J. E.	...	17th Bengal Infantry.
Esquire	...	Bramley, P. B.	...	Dist. Supdt., Police.
Lieutenant	...	Bredin, A.	...	12th Madras Infantry.
Captain, D.S.O.	...	Bretherton, G. H.	...	Asst. Comy.-Genl.
Colonel, C.B.	...	Broadbent, J. E.	...	R. E.
Lt.-Colonel	...	Bromfield, F. W.	...	Cheshire Regt.

## ORDINARY MEMBERS—continued.

Rank.	Name.	Corps, &c.
Captain ...	Brooking, H. T. ...	D. A. A. General.
Major ...	Broughton, E. C. ...	York and L. Regt.
Captain ...	Brown, W. H. ...	25th Madras Infantry.
Colonel, D.S.O. ...	Browne, A. G. F. ...	2-4th Gurkha Rifles.
Major ...	Browne, R. A. ...	1st Border Regiment.
Lt.-Colonel ...	Brownlow, C. B. ...	4th Sikh Infantry.
Lieutenant ...	Bruce, J. ...	19th Bengal Lancers.
Lieutenant ...	Bruel, F. A. ...	Gloucestershire Regt.
Lt.-Colonel ...	Brunker, J. M. S. ...	R. A.
Lieutenant ...	Brunner, F. W. ...	R. E.
Captain ...	Brush, J. E. R. ...	1st Royal Irish Fus.
Captain ...	Bryan, T. W. G. ...	R. A.
Captain ...	Buck, W. T. ...	2nd Durham L. I.
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Lt.-Colonel ...	Bullock, G. M. ..	Devonshire Regt.
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Major ...	Burn, A. E. P. ...	23rd Punjab Pioneers.
Esquire ...	Burn, R. N. ...	Dy. Acctt.-G., P. W. D.
Major ...	Burn-Murdoch, J. ...	R. E.
Major ...	Burrard, W. D. ...	R. A.

## LIFE MEMBERS—continued.

Rank.	Name.		Corps, &c.
Lieutenant ...	Davidson, Houston, C.	E. D.	5th Punjab Infantry.
Colonel, D.S.O. ...	Deshon, C. J.	...	Late R. A.
Captain ...	Dewing, R. H.	...	16th Madras Infantry.
Colonel, C.B., C.I.E.	Durand, A. G. A.	...	C. I. Horse.
Lt.-Col., Dart, C.B.	Durand, Sir E. L.	...	I. S. Corps.
Major ...	Eardley-Wilmet, A.	...	R. A.
Major, M.D. ...	Edwards, W. R.	...	I. M. S.
Major ...	Egerton, R. G.	...	"Q. O." Corps of Guides.
The Hon'ble. K.C.B.I., C.I.E.	Elliot, Sir C. A.	...	C. S.
Esquire, M.D. ...	Evans, Griffith	...	Retired.
Captain ...	Ewbank, W.	...	R. E.
Lt.-Colonel ...	Finn, H.	...	21st Lancers.
Lt.-Colonel ...	Francis, G. F.	...	5th Bombay Cavalry.
Captain ...	Frazer, G. S.	...	6th Infantry, H. O.
Lieutenant ...	Fulton, H. T.	...	2-2nd Gurkhas.
Maj.-Genl., C.B....	Gatacre, J.	...	I. S. Corps.
Major ...	Gibbings, H. C. C.	...	Retired.
Maj.-Genl., C.B....	Gosset, M. W. E.	...	Comdg. Dublin Dist.
Lt.-Colonel ...	Gowan, W. E.	...	Retired.
Colonel ...	Graves, S. H. P.	...	A. A. General.

## LIFE MEMBERS—continued.

Rank.	Name.	Corps, &c.
Colonel, H. H., G.C.S.I.	Gwalior, Maharaja Adhiraj Sir Madho Rao Sindhia of— ...	.....
Major ...	Haig, D. ...	7th Hussars.
Colonel ...	Hanna, H. B. ...	I. S. Corps.
Captain ...	Headlam, J. E. W. ...	R. H. A.
Captain ...	Hogg, T. C. M. T. ...	8th Bengal Cavalry.
Col., K.O.I.E., C.B.	Holdich, Sir T. H. ...	Late R. E.
Maj.-Genl., K.C.B., D.S.O.	Hunter, A. ...	Comdg. Quetta District.
Lt.-Colonel ...	James, M. ...	Late R. A.
Captain ...	Kaye, W. J. P. ...	30th Punjab Infantry.
Major ...	Kerrich, G. S. ...	1st Madras Lancers.
Colonel ...	King-Harman, M. J. ...	I. S. Corps.
Captain ...	Knight, W. C. ...	4th Bengal Cavalry.
Lt.-Colonel ...	Lawford, E. E. M. ...	1st Madras Lancers.
Lieutenant ...	Lee, A. W. H. ...	16th Madras Infantry.
Lt.-Genl., C.B. ..	Little, H. A. ...	Retired.
Lt.-Colonel ...	Lowry, W. H. ...	28th Madras Infantry.
Lt.-Col., C.I.E. ...	McKay, H. K. ...	I. M. S.
Major ...	Manifold, J. F. ...	R. A.
Major ...	Mercer, H. F. ...	R. A.
Colonel ...	Morley, F. ...	Retired.



## LIFE MEMBERS—continued.

Rank.	Name.	Corps, &c.
Lieutenant ...	Morton, S. ...	24th Punjab Infantry.
Major, Nawab, Atser-i-Jang, Afsaruddula Bahadur, C.I.E.	Muhammad Ali Beg ...	3rd Lancers, H. C.
Colonel, C.I.E. ...	Muir, C. W. ...	17th Bengal Cavalry.
Lieutenant ...	Muscroft, W. St. C. ...	D. A. C. General.
Lt.-Colonel the Hon'ble.	Noel, E. ...	D. A. A. General.
Esquire ...	Ogilvie, G. M. ...	C. S.
Lt.-Colonel ...	Olivier, H. D. ...	R. E., B. B. and C. I. Ry. Vois.
Lt.-Colonel ..	Phayre, A. ...	3rd Bombay Cavalry.
Captain ...	Pilleau, A. L. ...	3rd Bombay Infantry.
Lt.-Colonel ...	Pollock, J. A. H. ...	1st Sikh Infantry.
Lt.-Col., D.S.O. ...	Prograve, E. R. J. ...	10th Madras Infantry.
Major Genl., C.B., C.S.I., A.D.C.	Protheroe, M. ...	Comdg. Barma Dist.
Captain ...	Ray, M. C. R. E. ...	7th Bengal Infantry.
Lt.-Colonel ...	Rehny, A. MacW. ...	7th Bengal Cavalry.
Field Marshal Right Hon'ble, V.C., K.P., G.C.B., G.C.I., G.C.I.E.	Roberts, Lord ...	Commanding the Forces in Ireland.
Captain ...	Roe, C. H. ...	R. E.
Lt.-General, C.B., C.S.I.	Sandford, G. E. L. S. ...	Late R. E.
Colonel ...	Sawyer, H. A. ...	I. S. Corps.
Captain ...	Scharinb, W. K. ...	5th Bengal Cavalry.

## LIFE MEMBERS—concluded.

Rank.		Name.		Corps, &c.
Captain	...	Seton, B. G.	...	I. M. S.
Major	...	Smith, J. G.	...	Asst. Commissary-Genl.
Colonel	...	Stainforth, W.	...	Retired.
Captain	...	Stewart, J. M.	...	2-5th Gurkha Rifles.
Lt.-General, K.C.B., A.-D.-C.		Stewart, Sir R. C.	...	.....
Major	...	Stockley, V. M.	...	16th Bengal Cavalry.
The Hon'ble, c.s.i.		Tupper, C. L.	...	Financial Commissioner.
Major	...	Turner, G. H.	...	26th Bombay Infantry.
Captain	...	Vaughan, E. G.	...	D. A. C. General.
Colonel, v.c.	...	Vousden, W. J.	...	I. S. Corps.
Major	...	Williams, G.	...	R. F.
Colonel	...	Willock, G. W.	...	Retired.
Colonel	...	Wilson, C. W. H.	...	Retired.
Lt.-Colonel	...	Worlledge, J. F.	...	6th Infantry, H. C.
Captain	...	Wynne, F. J. H.	...	37th Bengal Infantry.
Major	...	Yate, A. C.	...	29th Bombay Infantry.
The Hon'ble, K.C.S.I.		Young, Sir W. M.	...	Lt.-Governor, Punjab.
Captain	...	Younghusband, L. N...		19th Bengal Lancers.

**ORDINARY MEMBERS.**

Rank.	Name.	Corps, &c.
Colonel ...	Abbott, F. ...	7th Bombay Lancers.
Colonel, C.B. ...	Abbott, H. A. ...	Comdg. Malakand Force.
Major, D.S.O. ...	Abbott, H. E. S. ...	R. E.
Captain ...	Adam, F. L. ...	Scots Guards.
Lt.-Col., V.C., C.B. ...	Adams, R. B. ...	"Q. O." Corps of Guides.
Captain ...	Agnew, Q. G. K. ...	Royal Scots Fus.
The Hon'ble, M.A. ...	Aikman, R. S. ...	C. S.
Major ...	Aitken, A. E. ...	D. A. A. General.
Lt.-Col., D.S.O. ...	Aldworth, W. ...	D. of Cornwall's L. I.
Lieutenant ...	Alexander, H. S. ...	Erinpura Irregular Force.
Major ...	Alexander, R. S. ...	7th Bengal Cavalry.
Major ...	Allen, A. J. W. ...	A. A. General.
Major ...	Allen, R. F. ...	R. E.
Major ...	Allen, W. H. ...	Asst. Comy.-General.
Captain ...	Allen, W. J. B. ...	R. A.
Lieutenant ...	Allgood, B. ...	Royal Irish Rifles.
Captain ...	Anderson, C. C. ...	25th Punjab Infantry.
Major ...	Anderson, J. H. A. ...	2nd Manchester Regt.
Major ...	Angulo, F. W. P. ...	9th Bengal Lancers.
Lieutenant ...	Annesley, J. H. A. ...	18th Hussars.
Major ...	Aplin, P. J. H. ...	7th Bombay Infantry.

## ORDINARY MEMBERS—continued.

Rank.	Name.	Corps, &c.
Captain ...	Archer, O. ...	Dy. Commissioner.
Captain ...	Armstrong, J. O. ...	Royal Inniskilling Fus.
Captain ...	Arnold, A. S. ...	1st Madras Lancers.
Maj.-General ...	Arnott, N. ...	R. E.
Lt.-Colonel ...	Aslett, W. O. ...	8th Bombay Infantry.
Esquire ...	Atkinson, G. W. E. ...	Late Survey Dept.
Lt.-Colonel, v.c. ...	Aylmer, F. J. ...	R. E., A. A. Genl.
Captain ...	Badcock, A. J. ...	Dy. Asst. Comy.-Genl.
Maj.-Genl., c.B., c.s.i.	Badcock, A. R. ...	Qr. Mr. Genl. in India.
Major ...	Baddeley, C. E. ...	R. E.
Colonel ...	Baden-Powell, R. S. S. ...	Comdg. at Mafeking.
Major ...	Bailward, A. O. ...	R. A.
Lieutenant ...	Baker, O. O. ...	Royal Irish Rifles.
Lt.-Colonel ...	Balfe, E. ...	J. A. General in India.
Major ...	Balfour, J. H. ...	13th Bengal Lancers.
Lieutenant ...	Balfour, P. ...	Highland L. I.
Captain ...	Ballard, C. R. ...	1st Bn. Norfolk Regt.
Captain ...	Banbury, W. E. ...	25th Madras Infantry.
Br.-General ...	Barlow, J. A. ...	Dy. Adj. General.
Br.-General, c.B., C.M.G., A.-D.-C.	Barnard, J. H. ...	Comdg. Mandalay Dist.
Lt.-Col., D.S.O. ...	Barrett, A. L. ...	43rd Gurkha Rifles.

## ORDINARY MEMBERS—continued.

Rank.	Name.	Corps, &c.
Lt.-Col., c.m.o., D.S.O.	Barrow, A. F.	... Offg. A. Q. M. Genl., I. B.
Colonel, c.b.	Barrow, E. G.	... Comdg. Kohat-Kurram Force.
Captain	Barrow, G. deS.	... 4th Bengal Cavalry.
Captain	Barton, F. J. H.	... "Q. O." Corps of Guides
Captain	Basevi, W. H. F.	... 31st Madras Infantry.
Reverend	Bateson, J. H.	... ..
Lt.-Colonel	Batten, A. C.	... 2nd Punjab Cavalry.
Captain	Batten, F. G.	... 1st Madras Pioneers
Lieutenant	Bayley, L. S.	... R. A.
Major, D.S.O.	Bayly, A. W. L.	... Asst. Adjt. General.
Captain	Bazalgette, L. H.	... 2nd Suffolk Regiment.
Major	Beale, A.	... 5th Bombay Infantry.
Captain	Beames, D.	... 12th Punjab Infantry.
Lt.-Colonel	Beatson, C. H.	... I. M. S.
Lt.-Colonel, c.b.	Beatson, S. B.	... 11th Bengal Lancers.
Captain	Beatty, L. N.	... A. D. C. to H. E. the C - in C.
Esquire	Becher, A. R.	... Asst.-Genl., P. W. D.
Captain	Becher, H. W.	... West Riding Regiment.
Major	Bell Irving, A.	... R. A.
Major	Bellers, E. V.	... Middlesex Regiment.
Maj.-Genl., c.b.	Bengough, H. M.	... Retired.

## ORDINARY MEMBERS—continued.

Rank.	Name.	Corps, &c.
Captain ...	Bentinck, R. J. ...	S. C.
The Hon'ble, C.I.E.	Beresford, J. S. ...	C. S.
Major ...	Beresford, W. R. H. ...	D. A. A. G. for Instn.
Major ...	Bethell, H. A. ...	R. A.
Captain ...	Bethune, H. A. ...	Gordon Highlanders.
Major ...	Bewicke, H. B. N. ...	Retired.
Major ...	Bewicke-Copley, R. C. A. B.	King's Royal R. Corps.
Captain ...	Beynon, H. L. N. ...	R. A.
Major, D.S.O. ...	Beynon, W. G. L. ...	1-3rd Gurkha Rifles.
Major ...	Biddulph, S. F. ...	19th Bengal Lancers.
Major, D.S.O. ...	Biggs, H. V. ...	R. E.
Captain ...	Bingley, A. H. ...	7th Bengal Infantry.
Lt.-Genl., K.C.I.E., C.B.	Bird, Sir G. C. ...	I. S. Corps.
Lt.-Colonel ...	Bird, W. J. B. ...	Contr. of Mily. Accts.
Lt.-Colonel ...	Birdwood, W. S. ...	10th Bombay Infantry.
Maj.-Genl., C.B....	Biscoe, W. W. ...	Staff Corps.
Colonel, K.C.I.E....	Bisset, Sir W. S. S. ...	R. E.
Br.-General ...	Black, W. O. ...	Comdg. Deesa Dist.
Major ...	Blane, O. F. ...	R. A.
Captain ...	Bliss, L. H. P. ...	Duke of Cornwall's L. I.
Maj.-Genl., K.C.B.	Blood, Sir B. ...	Comdg. Meerut Dist.

## ORDINARY MEMBERS—continued.

Rank.	Name.	Corps, &c.
Major	Blood, W. P.	2nd Royal Irish Fus.
Major	Blyth, H. R.	Royal Warwick. Regt.
Captain	Boddam, E. B. C.	25th Gurkha Rifles.
Captain	Boileau, F. R. F.	R. E.
Major	Bond, F. G.	R. E.
Captain	Bonham-Carter, H.	R. E.
Major, R.S.O.	Borradaile, H. B.	32nd Pioneers.
Lt-Colonel	Borton, A. C.	U. Active List.
Captain	Bourquet, J. T. I.	2nd Border Regt.
Captain	Boulnois, W. A.	R. A.
Major	Bower, H.	17th Bengal Cavalry.
Major	Bowen, W. H.	D. A. A. General.
Colonel, C.S.I.	Breckenbury, M. C.	R. E.
Captain	Brodley, H. V.	22nd Gurkha Rifles.
Captain	Brodshaw, F. E.	Asst. Commissioner.
Lt-Colonel	Brodshaw, L. J. E.	17th Bengal Infantry.
Esquire	Brownlie, P. B.	Dist. Supt. Police.
Lieutenant	Brown, A.	12th Madras Infantry.
Captain, R.S.O.	Buckleton, G. H.	Asst. Comy-Genl.
Colonel, C.S.I.	Bucknott, J. H.	R. E.
Lt-Colonel	Burton, F. W.	Cheshire Regt.

## ORDINARY MEMBERS—continued.

Rank.		Name.		Corps, &c.
Captain	...	Brooking, H. T.	...	D. A. A. General.
Major	...	Broughton, E. C.	...	York and L. Regt.
Captain	...	Brown, W. H.	...	25th Madras Infantry.
Colonel, D.S.O.	...	Browne, A. G. F.	...	24th Gurkha Rifles.
Major	...	Browne, R. A.	...	1st Border Regiment.
Lt.-Colonel	...	Brownlow, C. B.	...	4th Sikh Infantry.
Lieutenant	...	Bruce, J.	...	19th Bengal Lancers.
Lieutenant	...	Bruel, F. A.	...	Gloucestershire Regt.
Lt.-Colonel	...	Brunker, J. M. S.	...	R. A.
Lieutenant	...	Brunner, F. W.	...	R. E.
Captain	...	Brush, J. E. R.	...	1st Royal Irish Fus.
Captain	...	Bryan, T. W. G.	...	R. A.
Captain	...	Buck, W. T.	...	2nd Durham L. I.
Lt.-Colonel	...	Buckland, P. A.	...	Supdt., Army Clothing.
Lt.-Colonel	...	Bullock, G. M.	...	Devonshire Regt.
Major	...	Bunbury, W. E.	...	Dy. Asst. Qr. Mr. Genl.
Lt.-Colonel	...	Burgess, F. F. R.	...	I. S. Corps.
Major	...	Burn, A. E. P.	...	23rd Punjab Pioneers.
Esquire	...	Burn, R. N.	...	Dy. Acctt.-G., P. W. D.
Major	...	Burn-Murdoch, J.	...	R. E.
Major	...	Burrard, W. D.	...	R. A.



## ORDINARY MEMBERS—continued.

Rank.		Name.		Corps, &c.
Major	...	Burrowes, H. G.	...	R. A.
Colonel	...	Burton, F. C.	...	A. A. General.
Captain	...	Burton, R. G.	...	1st Infantry, H. C.
Major	...	Butcher, A. E. A.	...	R. A.
Major	...	Bythell, W. J.	...	R. E.
Maj.-Genl., c.B....		Caldecott, F. J.	...	Late R. A.
Major	...	Callwell, A. H.	...	R. A.
Captain	...	Campbell, C. F.	...	6th Bengal Cavalry.
Major	..	Campbell, C. P.	...	C. I. Horse.
Captain	...	Campbell, G. P.	...	25th Punjab Infantry.
Lieutenant	...	Campbell, I. H.	...	7th Bengal Cavalry.
Lieutenant	...	Campbell, J.	...	A. and S. Highlanders.
Colonel	...	Campbell, L. R. H. D.		Comdg. at Fyzabad.
Captain	...	Campbell, L. W. Y.	...	8th Madras Infantry.
Major	...	Campbell, W.	...	Gordon Highlanders.
Captain	...	Campbell, W. N.	...	Burma Military Police.
Lt.-Colonel	..	Candy, J. M.	...	14th Bombay Infantry.
Lieutenant	...	Capper, A. S.	...	C. I. Horse.
Lt.-Colonel	...	Capper, W. B.	...	Northamptonshire Regt.
Major	...	Carbonaro, E.	...	I. S. Corps.
Captain	...	Cardew, F. G.	...	Offg. Dy. Secy., M. D.

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# ORDINARY MEMBERS—continued.

Corps, &c.	Rank	Name.	Corps, &c.
	Esquiro ...	Carey, A. D. ...	C. S.
General.	Lieutenant ...	Carleton, H. A. ...	33rd Madras Infantry.
try, H. C.	Colonel, C. I. E., A. D. C.	Carnac, J. H. Rivett ...	Retired.
	Capt. the Hon'ble	Carnegie, R. F. ...	Gordon Highlanders.
	Captain ...	Carnell, N. M. ...	Burma Railway Vols.
	Major ...	Carpendale, P. M. ...	21st Punjab Infantry.
	Captain ...	Carpendale, W. M. ...	8th Bengal Cavalry.
Cavalry.	Captain ...	Carson, T. ...	Royal Irish Rifles.
	Major ...	Carson, W. P. ...	Retired List.
Infantry.	Major ...	Carthew-Yorstown, M.E.	4th Bombay Cavalry.
Cavalry.	Captain ...	Cartright, C. M. ...	2nd Bombay Lancers.
Highlanders.	Lieutenant ...	Cattell, G. L. ...	25th Madras Infantry.
abad.	Lt.-Colonel ...	Cavenagh, W. O. ...	Bedfordshire Regt.
entry.	Major ...	Cavendish, C. C. ...	2nd Highland L. I.
ders.	Colonel ...	Chamberlain, N. F. F. G.	I. S. Corps.
Police.	Lieutenant ...	Chamier, A. T. ..	R. E.
entry.	General, v.c., c.B.	Channer, G. N. ...	Retired List.
	Lt.-Col., v. d. ...	Chanter, E. J. ...	2nd P. Vol. Rifles.
Regt.	Lt.-Colonel ...	Chapman, L. J. A. ...	R. A.
	Lt.-Col., v. c. ...	Chase, W. St. L. ...	7th Bombay Infantry.
D.	Major ...	Chenevix-Trench, G. F.	Political Agent.

## ORDINARY MEMBERS—continued.

Rank.	Name.	Corps, &c.
Major	... Blood, W. P.	... 2nd Royal Irish Fus.
Major	... Blyth, H. R.	... Royal Warwick. Regt.
Captain	... Boddam, E. B. C.	... 25th Gurkha Rifles.
Captain	... Boileau, F. R. F.	... R. E.
Major	... Bond, F. G.	... R. E.
Captain	... Bonham-Carter, H.	... R. E.
Major, Reso.	... Borradaile, H. B.	... 32nd Pioneers.
Lt-Colonel	... Borton, A. C.	... U. Active List.
Captain	... Bosquet, J. T. I.	... 2nd Border Regt.
Captain	... Boulnois, W. A.	... R. A.
Major	... Bowler, H.	... 17th Bengal Cavalry.
Major	... Bowles, W. H.	... D. A. A. General.
Colonel, C.S.I.	... Buckenbury, M. C.	... R. E.
Captain	... Brody, H. V.	... 22nd Gurkha Rifles.
Captain	... Brodshaw, F. E.	... Asst. Comptroller.
Lt-Colonel	... Brodshaw, L. J. E.	... 17th Bengal Infantry.
Esquire	... Brodsky, P. B.	... Dist. Supply Police.
Lieutenant	... Brown, A.	... 12th Madras Infantry.
Captain, C.S.I.	... Bruckstein, G. H.	... Asst. Comptroller.
Colonel, C.S.I.	... Bruckstein, J. E.	... R. E.
Lt-Colonel	... Bruckstein, F. W.	... Cheshire Regt.

## ORDINARY MEMBERS—continued.

Rank.		Name.		Corps, &c.
Captain	...	Brooking, H. T.	...	D. A. A. General.
Major	...	Broughton, E. C.	...	York and L. Regt.
Captain	...	Brown, W. H.	...	25th Madras Infantry.
Colonel, D.S.O.	...	Browne, A. G. F.	...	2-4th Gurkha Rifles.
Major	...	Browne, R. A.	...	1st Border Regiment.
Lt.-Colonel	...	Brownlow, C. B.	...	4th Sikh Infantry.
Lieutenant	...	Bruce, J.	...	19th Bengal Lancers.
Lieutenant	...	Bruel, F. A.	...	Gloucestershire Regt.
Lt.-Colonel	...	Brunker, J. M. S.	...	R. A.
Lieutenant	...	Brunner, F. W.	...	R. E.
Captain	...	Brush, J. E. R.	...	1st Royal Irish Fus.
Captain	...	Bryan, T. W. G.	...	R. A.
Captain	...	Buck, W. T.	...	2nd Durham L. I.
Lt.-Colonel	...	Buckland, P. A.	...	Supdt., Army Clothing.
Lt.-Colonel	...	Bullock, G. M.	...	Devonshire Regt.
Major	...	Bunbury, W. E.	...	Dy. Asst. Qr. Mr. Genl.
Lt.-Colonel	...	Burgess, F. F. R.	...	I. S. Corps.
Major	...	Burn, A. E. P.	...	23rd Punjab Pioneers.
Esquire	...	Burn, R. N.	...	Dy. Acctt.-G., P. W. D.
Major	...	Burn-Murdoch, J.	...	R. E.
Major	...	Burrard, W. D.	...	R. A.

## ORDINARY MEMBERS—continued.

Rank.	Name.	Corps, &c.
Captain	Chesney, N. E.	25th Gurkha Rifles.
Lieutenant	Cheyne, A. Y.	15th Bengal Lancers.
Lt.-Colonel	Chisholme, J. J. S.	5th Lancers.
Captain	Chitty, W. W.	19th Bombay Infantry.
Lieutenant	Chrystie, G.	5th Punjab Cavalry.
Major	Churchill, A. B. N.	R. A.
Lt.-Genl., <i>Bart.</i> K.C.B.	Clarke, Sir C. M.	Q. M. to the Forces, England.
Captain	Clarke, T. E.	2nd Royal Ins. Fusiliers.
Captain	Clay, C. H.	17th Gurkha Rifles.
Captain	Clay, S.	13th Gurkha Rifles.
Lieutenant	Clayton, E. R.	2nd Oxfordshire L. I.
Major-Genl.	Clifford, R. M.	I. S. Corps.
Captain	Close, L. H.	R. E.
Lt. Colonel	Clothier, R. F.	27th Madras Infantry.
Major	Coates, J. U.	R. A.
Lt.-Colonel	Coats, G. H. B.	25th Punjab Infantry.
Esquire	Cockle, M. J. D.	.....
Captain	Colstream, W. M.	R. E.
Major	Cole, A. W. G. L.	1st B. Welsh Fusiliers.
Esquire	Cole, C. J.	Public Works Dept.
Captain	Cole, E. H.	11th Bengal Lancers.
Lt.-Colonel	Cole, H. H.	Late R. E.

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## ORDINARY MEMBERS—continued.

Corps, &c.	Rank.	Name.	Corps, &c.
Gurkha Rifles.	Major ...	Coleman, W. F. ...	2nd Suffolk Regiment.
Bengal Lancers.	Lieutenant ...	Collen, E. H. E. ...	R. A.
ers.	The Hon'ble Maj.-Genl., K.C.I.E., C.B.	Collen, Sir E. H. H. ...	Military Member, Vice-regal Council.
Bombay Infantry.	Lt. Colonel ...	Collette, C. H. ...	1st Shropshire L. I.
1st Cavalry.	Major ...	Colomb, F. C. ...	42nd Gurkha Rifles.
, the Force	Captain ...	Combe, L. ...	1st Scottish Rifles.
Inf. Fusiliers	Captain ...	Comins, H. ...	1st Bengal Infantry.
Gurkha Rifles.	Captain ...	Conner, R. ...	1st Gloucestershire Regt.
Gurkha Rifles.	Captain ...	Conran, W. L. ...	25th Bombay Infantry.
Shropshire L. I.	Captain ...	Cook, H. R. ...	R. A.
	Lt.-Colonel ...	Cook, W. ...	I. S. Corps.
	Maj.-Genl. ...	Cooke, T. A. ...	.....
Infantry.	Captain ...	Cookson, G. A. ...	16th Bengal Cavalry.
	Captain ...	Cooper, H. A. ...	1st Sikh Infantry.
Infantry.	Lieutenant ...	Corbyn, E. C. ...	18th Bengal Lancers.
	Major ...	Cordue, W. G. R. ...	R. E.
	Lt.-Col., p.s.o. ...	Couchman, G. H. H. ...	Somersetshire L. I.
Infantry.	Lt.-Colonel ...	Courtenay, E. R. ...	11th Hussars.
Dept.	Esquiro ...	Coutts, E. G. ...	Public Works Dept.
Lancers.	Captain ...	Cowper, M. ...	10th Bengal Lancers.
	Lieutenant ...	Cox, C. E. S. ...	1st Madras Lancers.

## ORDINARY MEMBERS—continued.

Rank.	Name.	Corps, &c.
Captain ...	Cox, H. V. ...	21st Madras Infantry.
Lieutenant ...	Cox, T. S. ...	16th Bengal Cavalry.
Lt.-Colonel ..	Coxhead, J. A. ...	R. A.
Colonel ...	Craigie, J. H. S. ...	Asst. Adjutant Genl.
Br.-Genl., v.c. ...	Creagh, O'M. ...	Comdg. Aden Dist.
Captain ...	Crookshank, C. deW. ...	R. E.
Captain ...	Crosthwaite, J. G. ...	Asst. Commissioner.
Major ...	Crowe, J. H. V. ...	R. A.
Major ...	Crowther, R. T. ...	23rd Punjab Pioneers.
Lieutenant ...	Cruddas, H. W. ...	35th Bengal Infantry.
Lieutenant ...	Cumberledge, C. J. ...	23rd Bombay Infantry
Lieutenant ...	Cunningham, A. H. ...	R. E.
Captain ...	Cuppaze, W. A. ...	5th Bengal Infantry.
Major, D.S.O. ...	Cure, H. C. ...	1st Gloucestershire Regt.
Lt.-Col., c.B. ...	Currie, T. ...	1st N. Staffordshire Regt
Captain ...	Dallas, A. G. ...	16th Lancers.
Maj.-Genl., c.F. ...	Dalrymple, W. L. ...	Retired.
Captain, C.I.E. ...	Daly, H. ...	Dy Secy, Foreign Dept.
Captain ...	Daunt, W. D. ...	C. I. Horse.
Lieutenant ...	Davidson, S. R. ...	S. C.
Captain ...	Davidson, W. L. ...	17th Bengal Infantry.

## ORDINARY MEMBERS—continued.

Rank.	Name.	Corps, &c.
Major ...	Davies, A. M. ...	R. A. M. Corps.
Captain ...	Davies, H. R. ...	2nd Oxfordshire L. Infy.
Captain ...	Davis, O. ...	1st Bengal Lancers.
Major ...	Davison, K. S. ...	2nd Bengal Lancers.
Lieutenant ...	Davy, R. M. M. ...	1st Gloucestershire Regt.
The Hon'ble ...	Dawkins, O. E. ...	Member of the Viceregal Council.
Major ...	Dawkins, H. S. ...	R. A.
Captain ...	Dawson, E. ...	Rangoon Vol. Rifles.
Captain ...	Day, A. C. FitzR. ...	1st Dorsetshire Regt.
Major ...	Day, J. G. ...	R. E.
Lt.-Colonel ...	DeBrath, E. ...	Dy. Secy., Mily. Dept.
Lieutenant ...	deLabilliere, E. G. D....	22nd Punjab Infantry.
Captain, c.m.g., c.i.e. ...	DeLasece, A. F. ...	Pol. Agent.
Captain, d.s.o. ...	DeLisle, H. DeB. ...	2nd Durham L. Infy.
Captain ...	Denne, A. R. ...	2nd Madras Infantry.
Colonel ...	Des Vœux, O. H. ...	36th Sikhs.
Major ...	Dewar, D. E. ...	R. A.
Captain ...	Dick, A. B. ...	2nd Punjab Cavalry.
Lt.-Col., v.c. ...	Dick-Cunyngham, W. H. ...	2nd Gordon Highlanders.
Captain ...	Dickson, J. H. ...	Dy. A. C. General.
Captain ...	Dill, B. ...	2nd Yorkshire L. I.



## ORDINARY MEMBERS—continued.

Rank.	Name.	Corps, &c.
Major ...	Burrowes, H. G. ...	R. A.
Colonel ...	Burton, F. C. ...	A. A. General.
Captain ...	Burton, R. G. ...	1st Infantry, H. C.
Major ...	Butcher, A. E. A. ..	R. A.
Major ...	Bythell, W. J. ...	R. E.
Maj.-Genl., c.B....	Caldecott, F. J. ...	Late R. A.
Major ...	Callwell, A. H. ...	R. A.
Captain ...	Campbell, C. F. ...	6th Bengal Cavalry.
Major ..	Campbell, C. P. ...	C. I. Horse.
Captain ...	Campbell, G. P. ...	25th Punjab Infantry.
Lieutenant ...	Campbell, I. H. ...	7th Bengal Cavalry.
Lieutenant ...	Campbell, J. ...	A. and S. Highlanders.
Colonel ...	Campbell, L. R. H. D.	Comdg. at Fyzabad.
Captain ...	Campbell, L. W. Y. ...	5th Madras Infantry.
Major ...	Campbell, W. ...	Gordon Highlanders.
Captain ...	Campbell, W. N. ...	Burma Military Police.
Lt. Colonel ..	Candy, J. M. ...	14th Bombay Infantry.
Lieutenant ...	Capper, A. S. ...	C. I. Horse.
Lt. Colonel ...	Capper, W. B. ...	Northamptonshire Regt.
Major ...	Carbonaro, E. ...	I. S. Corps.
Captain ...	Cardew, F. G. ...	Offg. Dy. Secy., M. D.

## ORDINARY MEMBERS—continued.

Rank.	Name.	Corps, &c.
Esquire ...	Carey, A. D. ...	C. S.
Lieutenant ...	Carleton, H. A. ...	33rd Madras Infantry.
Colonel, C. I. E., A.-D.-C.	Carnac, J. H. Rivett ...	Retired.
Capt. the Hon'ble	Carnegie, R. F. ...	Gordon Highlanders.
Captain ...	Carnell, N. M. ...	Burma Railway Vols.
Major ...	Carpendale, P. M. ...	21st Punjab Infantry.
Captain ...	Carpendale, W. M. ...	8th Bengal Cavalry.
Captain ...	Carson, T. ..	Royal Irish Rifles.
Major ...	Carson, W. P. ...	Retired List.
Major ...	Carthew-Yorstoun, M.E.	4th Bombay Cavalry.
Captain ...	Cartright, C. M. ...	2nd Bombay Lancers.
Lieutenant ...	Cattell, G. L. ...	25th Madras Infantry.
Lt.-Colonel ...	Cavenagh, W. O. ...	Bedfordshire Regt.
Major ...	Cavendish, C. C. ...	2nd Highland L. I.
Colonel ...	Chamberlain, N. F. F. G.	I. S. Corps.
Lieutenant ...	Chamier, A. T. ...	R. E.
General, V.C., C.B.	Channer, G. N. ...	Retired List.
Lt.-Col., V. D. ...	Chanter, E. J. ...	2nd P. Vol. Rifles.
Lt.-Colonel ...	Chapman, L. J. A. ...	R. A.
Lt.-Col., V. C. ...	Chase, W. St. L. ...	7th Bombay Infantry.
Major ...	Chenevix-Trench, G. F.	Political Agent.

## ORDINARY MEMBERS—continued.

Rank.	Name.	Corps, &c.
Captain ...	Chesney, N. E. ...	2-5th Gurkha Rifles.
Lieutenant ...	Cheyne, A. Y. ...	15th Bengal Lancers.
Lt.-Colonel ...	Chisholme, J. J. S. ...	5th Lancers.
Captain ...	Chitty, W. W. ...	19th Bombay Infantry.
Lieutenant ...	Chrystie, G. ...	5th Punjab Cavalry.
Major ...	Churchill, A. B. N. ...	R. A.
Lt.-Genl., <i>Bart.</i> , K.C.B.	Clarke, Sir C. M. ...	Q. M. to the Forces, England.
Captain ...	Clarke, T. E. ...	2nd Royal Ins. Fusiliers.
Captain ...	Clay, C. H. ...	43rd Gurkha Rifles.
Captain ...	Clay, S. ...	43rd Gurkha Rifles.
Lieutenant ...	Clayton, E. R. ...	2nd Oxfordshire L. I.
Major-Genl. ...	Clifford, R. M. ...	I. S. Corps.
Captain ...	Close, L. H. ...	R. E.
Lt. Colonel ...	Clothier, R. F. ...	27th Madras Infantry.
Major ...	Coates, J. U. ...	R. A.
Lt.-Colonel ...	Coats, G. H. B. ...	25th Punjab Infantry.
Esquire ...	Cockle, M. J. D. ...	.....
Captain ...	Coldstream, W. M. ...	R. E.
Major ...	Cole, A. W. G. L. ...	1st R. Welsh Fusiliers.
Esquire ...	Cole, C. J. ...	Public Works Dept.
Captain ...	Cole, E. H. ...	11th Bengal Lancers.
Lt.-Colonel ...	Cole, H. H. ...	Late R. E.

## ORDINARY MEMBERS—continued.

Rank.		Name.		Corps, &c.
Major	...	Coleman, W. F.	...	2nd Suffolk Regiment.
Lieutenant	...	Collen, E. H. E.	...	R. A.
The Hon'ble Maj.-Genl., K.C.I.E., C.B.		Collen, Sir E. H. H.	...	Military Member, Vice-regal Council.
Lt.-Colonel	...	Collette, C. H.	...	1st Shropshire L. I.
Major	...	Colomb, F. C.	...	42nd Gurkha Rifles.
Captain	...	Combe, L.	...	1st Scottish Rifles.
Captain	...	Comins, H.	...	1st Bengal Infantry.
Captain	...	Conner, R.	...	1st Gloucestershire Regt.
Captain	...	Conran, W. L.	...	25th Bombay Infantry.
Captain	...	Cook, H. R.	...	R. A.
Lt.-Colonel	...	Cook, W.	...	I. S. Corps.
Maj.-Genl.	...	Cooke, T. A.	...	.....
Captain	...	Cookson, G. A.	...	16th Bengal Cavalry.
Captain	...	Cooper, H. A.	...	1st Sikh Infantry.
Lieutenant	...	Corbyn, E. C.	...	18th Bengal Lancers.
Major	...	Cordue, W. G. R.	...	R. E.
Lt.-Col., D.S.O.	...	Couchman, G. H. H.	...	Somersetshire L. I.
Lt.-Colonel	...	Courtenay, E. R.	...	11th Hussars.
Esquire	...	Coutts, E. G.	...	Public Works Dept.
Captain	...	Cowper, M.	...	10th Bengal Lancers.
Lieutenant	...	Cox, C. E. S.	...	1st Madras Lancers.

## ORDINARY MEMBERS—continued.

Rank.		Name.		Corps, &c.
Captain	...	Cox, H. V.	...	21st Madras Infantry.
Lieutenant	...	Cox, T. S.	...	16th Bengal Cavalry.
Lt.-Colonel	...	Coxhead, J. A.	...	R. A.
Colonel	...	Craigie, J. H. S.	...	Asst. Adjutant Genl.
Br.-Genl., v.c.	...	Creagh, O'M.	...	Comdg. Aden Dist.
Captain	...	Crookshank, C. deW.	...	R. E.
Captain	...	Crosthwaite, J. G.	...	Asst. Commissioner.
Major	...	Crowe, J. H. V.	...	R. A.
Major	...	Crowther, R. T.	...	23rd Punjab Pioneers.
Lieutenant	...	Cruddas, H. W.	...	38th Bengal Infantry.
Lieutenant	...	Cumberledge, C. J.	...	23rd Bombay Infantry.
Lieutenant	...	Cunningham, A. H.	...	R. E.
Captain	...	Cuppige, W. A.	...	5th Bengal Infantry.
Major, D.S.O.	...	Cure, H. O.	...	1st Gloucestershire Regt.
Lt.-Col., C.B.	...	Currie, T.	...	1st N. Staffordshire Regt.
Captain	...	Dallas, A. G.	...	16th Lancers.
Maj.-Genl., C.B.	...	Dalrymple, W. L.	...	Retired.
Captain, C.I.E.	...	Daly, H.	...	Dy. Secy., Foreign Dept.
Captain	...	Daunt, W. D.	...	C. I. Horse.
Lieutenant	...	Davidson, S. R.	...	S. C.
Captain	...	Davidson, W. L.	...	17th Bengal Infantry.

## ORDINARY MEMBERS—continued.

Rank.		Name.		Corps, &c.
Major	...	Davies, A. M.	...	R. A. M. Corps.
Captain	...	Davies, H. R.	...	2nd Oxfordshire L. Infy.
Captain	...	Davis, O.	...	1st Bengal Lancers.
Major	...	Davison, K. S.	...	2nd Bengal Lancers.
Lieutenant	...	Davy, R. M. M.	...	1st Gloucestershire Regt.
The Hon'ble	...	Dawkins, O. E.	...	Member of the Viceregal Council.
Major	...	Dawkins, H. S.	...	R. A.
Captain	...	Dawson, E.	...	Rangoon Vol. Rifles.
Captain	...	Day, A. C. FitzR.	...	1st Dorsetshire Regt.
Major	...	Day, J. G.	...	R. E.
Lt.-Colonel	...	DeBrath, E.	...	Dy. Secy., Mily. Dept.
Lieutenant	...	deLabilliere, E. G. D...	...	22nd Punjab Infantry.
Captain,	c.M.G.,	DeLassos, A. F.	...	Pol. Agent.
	C.I.E.			
Captain, D.S.O.	...	DeLisle, H. DeB.	...	2nd Durham L. Infy.
Captain	...	Denne, A. R.	...	2nd Madras Infantry.
Colonel	...	Des Vœux, O. H.	...	36th Sikhs.
Major	...	Dewar, D. E.	...	R. A.
Captain	...	Dick, A. B.	...	2nd Punjab Cavalry.
Lt.-Col., v.c.	...	Dick-Cunyngham, W. H.	...	2nd Gordon Highlanders.
Captain	...	Dickson, J. H.	...	Dy. A. C. General.
Captain	...	Dill, B.	...	2nd Yorkshire L. I.

## ORDINARY MEMBERS—continued.

Rank.		Name.		Corps, &c.
Lt.-Colonel	...	Dillon, G. F. H.	...	26th Punjab Infantry.
Lieutenant	...	Dixon, C. S.	...	Royal Irish Rifles.
Major	...	Dixon, P. E.	...	R. E.
Major	...	Dobbin, W. J. K.	...	1st Sikh Infantry.
Esquire	...	Donaldson, P.	...	Presdt., Simla Mplty.
Captain	...	Donnan, W.	...	Asst. Mily. Accountant.
Colonel, D.S.O.	...	Dorward, A. R. F.	...	R. E.
H. E. Rear-Admiral.		Douglas, A. C.	...	Naval C.-in-C., East Indies.
Captain	...	Douglas, J. A.	...	D. A. Q. M. Genl., I. B.
Captain	...	Dowding, H. H. H.	...	2nd Essex Regiment.
Captain	...	Dowell, G. O.	...	R. A.
Captain	...	Drummond, E. J.	...	I. S. Corps.
Major, C.I.B.	...	Drummond, F. H. R.	...	11th Bengal Lancers.
Lieutenant	...	Duckett, J. S.	...	9th Lancers.
Colonel, C.I.B.	...	Duff, B.	...	Asst. Mily. Secy., W. O.
Captain	...	Duff, G. M.	...	R. E.
Major	...	Duhan, W. W. T.	...	R. A.
Major	...	du Moulin, L. E.	...	Royal Sussex Regt.
Lt.-Colonel, M.D.		Duncan, A.	...	I. M. S.
Major, M.B.	...	Duncan, G.	...	I. M. S.
Captain	...	Duncan, S.	...	1st Gloucestershire Regt.

## ORDINARY MEMBERS—continued.

Rank.	Name.	Corps, &c.
Captain ...	Dunolly, K. J. G. ...	5th Madras Infantry.
Major ...	Dunsterville, K. S. ...	R. A.
Lt.-Colonel ...	Duperier, H. W. ...	R. E.
K.C.B.J., K.C.I.B. ...	Durand, Sir H. M. ...	C. S.
Colonel ...	Duthy, A. E. ...	R. A.
Colonel, c.B. ...	Dyce, G. H. C. ...	Comdg. Tochi Force.
Captain ...	Dyer, R. E. H. ...	29th Punjab Infantry.
Major ...	Eardley-Wilmot, I. ...	18th Bengal Lancers.
Major ...	Earle, F. A. ...	Royal War. Regt.
Captain, D.S.O. ...	East, L. W. P. ...	R. A.
Lieutenant ...	Eccles, C. J. ...	16th Lancers.
Major ...	Edwards, C. G. F. ...	5th Punjab Cavalry.
Captain, D.S.O. ...	Edwards, F. J. M. ...	D. A. A. General.
Major, D.S.O. ...	Edwards, J. B. ...	C. I. Horse.
Major-Genl., c.B., D.S.O., A.-D.-C.	Egerton, C. C. ...	Comdg. Punjab F. Force.
Captain ...	Egerton, C. P. ...	Dy. Commissioner.
Br.-Genl., K.C.B....	Elles, Sir E. R. ...	Comdg. Peshawar Dist.
Major-Genl., c.B., D.S.O.	Elliot, E. L. ...	I. G., Cavalry in India.
Lt.-Genl., c.B. ...	Evans, H. M. ...	I. S. Corps.
Major ...	Evatt, J. T. ...	39th Bengal Infantry.
Captain ...	Everett, H. J. ...	Somersetshire L. I.



## ORDINARY MEMBERS—continued.

Rank.	Name.	Corps, &c.
Colonel	Exham, R.	R. A. M. C.
Captain	Fagan, H. R.	1st Punjab Infantry.
Lieutenant	Fagan, L. E.	6th Madras Infantry.
Lt.-Colonel	Faithfull, H. T.	31st Punjab Infantry.
Captain	Fane, V. B.	1st Punjab Cavalry.
Esq., C.S.I., C.S....	Fanshawe, A. U.	D.-G., Post Office in India.
The Hon'ble, C.S.	Fanshawe, H. C.	Commissioner.
Captain	Fasken, W. H.	10th Bengal Lancers.
Captain	Faulknor, A. A. M. M.	2nd Bombay Infantry.
Captain	Fayrer, J. O. S.	1-5th Gurkha Rifles.
Major	Fegen, M. F.	R. A.
Major	Fell, R. B.	1st Scottish Rifles.
Major, D.S.O.	Fendall, C. P.	R. A.
Lt.-Colonel	Fenton, A. B.	A. A. General.
Lieutenant	Fergusson, A. C.	R. A.
Captain	Fergusson, H. C.	2nd Bn. H. L. Infantry.
Lt.-Colonel, D.S.O.	Ferrier, J. A.	R. E.
Captain	Finch, C.	1st Bengal Lancers.
Captain	Finch, E. H. F.	D. A. A. G. for Musketry.
Major	Fink, G. H.	I. M. S.
Esq., C.S.I., C.S. ...	Finlay, J. F.	Secy., Finance Dept.

## ORDINARY MEMBERS—continued.

Rank.	Name.	Corps, &c.
Lt.-Colonel ...	Finnis, H. ...	R.E., D.A. A. G. for R.E.
Captain ...	Firth, E. W. A. ...	9th Madras Infantry.
Captain —	Fisher, J. ...	2-2nd Gurkha Rifles.
Lt.-Colonel ...	FitzGerald, C. M. ...	A. C. General.
Captain ...	Fitz-Maurice, R. ...	R. A.
Captain ...	Foord, E. R. ...	Inspr., Mily. Accounts.
Captain ...	Forbes, L. A. ...	S. C.
Lt.-Colonel, C.B. ...	Forbes, W. E. G. ...	Royal War. Regt.
Captain ...	Ford, O. A. W. ...	4th Bombay Infantry.
Major ...	Forde, L. ...	R. A.
Captain ...	Forestier-Walker, C. E. ...	R. A.
Captain ...	Forth, C. T. W. ...	30th Punjab Infantry.
Lt.-Colonel ...	Foss, K. M. ...	26th Madras Infantry.
Captain ...	Fox-Strangways, T. S. ...	Royal Irish Rifles.
Col., C.I.E., Q.H.P.	Franklin, B. ...	I. M. S.
Captain ...	Fraser, L. D. ...	R. A.
Captain ...	Fraser, N. G. ...	4th Bombay Cavalry.
The Hon'ble, K.C.S.I.	Fryer, Sir F. W. B. ...	Lt.-Governor, Burma.
Major ...	Fuller, R. W. ...	R. A.
Lieutenant ...	Furse, G. A. ...	R. A.
Captain ...	Fyffe, B. O. ...	Gloucestershire Regt.

## ORDINARY MEMBERS—continued.

Rank.	Name.	Corps, &c.
Captain ...	Galloway, F. L. ...	R. A.
Lt.-Colonel ...	Gallwey, E. J. ...	2nd Somerset L. Infy.
Lt.-Colonel ...	Garbott, C. H. V. ...	2nd Bengal Lancers.
Lieutenant ...	Gardner, R. M. S. ...	Gloucestershire Regt.
Lieutenant ...	Garratt, H. S. ...	3rd Bombay Infantry.
Lt.-Colonel ...	Garteide-Tipping, R. F. ...	1st Bengal Lancers.
Br.-Genl., K.C.B., A.-D.-C.	Gaselee, Sir A. ...	Offg. Q. M. G. in India.
Lt.-Colonel ...	Gastrell, G. D. C. ...	8th Bengal Infantry.
Lt.-Genl., K.C.B., D.S.O.	Gatacre, Sir W. F. ...	Comdg. 3rd Division, S. Africa.
Lieutenant ...	Gausson, A. W. D. ...	2nd High. Lt. Infantry.
Major ...	Gawne, J. M. ...	Royal Lancaster Regt.
Lt.-Colonel ...	Gibbs, M. I. ...	31st Punjab Infantry.
Captain ...	Giles, A. ...	13th Bengal Infantry.
Captain ...	Glasgow, W. J. T. ...	R. West Surrey Regt.
Lt.-Colonel ...	Glennie, E. ...	R. E.
Lt.-Colonel ...	Goad, H. ...	Dir., Army Remount Department.
Captain ...	Godfrey, S. H. ...	Sett. Comr., Kashmir.
Lieutenant ...	Godwin, C. A. C. ...	3rd Punjab Cavalry.
Captain ...	Goodridge, W. S. ...	R. N., Dir., R. I. Marine.

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## ORDINARY MEMBERS—continued.

Corps, &c.	Rank.	Name.	Corps, &c.
	Colonel, C.I.B. ...	Gordon, J. C. F. ...	I. S. Corps.
	Captain ...	Gordon, J. L. R. ...	15th Sikhs.
Street L. Inf.	Captain ...	Gordon, Lincoln ...	Oudh Vol. Rifles.
al Lancers.	Colonel ...	Gordon, R. ...	I. S. Corps.
eshire Regt.	Major ...	Gordon, S. D. ...	D. A. A. General.
ay Infantry.	Captain ...	Gordon, W. E. ...	1st Gordon Highlanders.
al Lancers.	Lt.-Colonel ...	Gore, St. J. O. ...	5th Dragoon Guards.
U. G. in India	Major ...	Gough, S. C. ...	5th Bengal Cavalry.
al Infantry.	Major, D.S.O. ...	Graham, H. W. G. ...	5th Lancers.
rd Division, S	Captain ...	Graham, M. D. ...	Northamptonshire Regt.
	Colonel ...	Grant, H. G. ...	U. Active List.
Lt. Infantry.	Maj.-Genl., C.B. ...	Grant, H. F. ...	I. G. Cavalry, England.
aster Regt.	Colonel ...	Grant, Jas. ...	S. O.
b Infantry.	Lt.-Colonel ...	Grant, S. ...	B. E.
al Infantry.	Major ...	Grant, S. G. ...	Scottish Rifles.
urray Regt.	Captain ...	Grant-Duff, A. ...	Royal Highlanders.
	Colonel, C.B. ...	Graves, B. O. ...	S. O.
y Remount	Lt.-Colonel ...	Gray, W. du G. ...	1st Punjab Infantry.
ut.	Lt.-Colonel ...	Greenfield, R. M. ...	A. A. General.
Kashmir.	Captain ...	Greenhill-Gardyne, A. D.	Gordon Highlanders.
Cavalry.	Major ...	Grey, A. ...	Punjab Light Horse.
R. I. Marine			

## ORDINARY MEMBERS—continued.

Rank.	Name.	Corps, &c.
Captain ...	Grey, W. G. ...	3rd Madras Infantry.
Esquire, C.I.B. ...	Griesbach, O. L. ...	Dir., Geological Survey of India.
Captain ...	Griffith, G. H. ...	R. E.
Lieutenant ...	Grimley, W. M. ...	Asst. Military Accott.
Captain ...	Grimshaw, E. W. ...	24th Madras Infantry.
Captain ...	Grimston, R. E. ...	6th Bengal Cavalry.
Captain ...	Grimston, S. B. ...	18th Bengal Lancers.
Lieutenant ...	Grove, H. M. ...	S. C.
Lt.-Colonel ...	Grover, M. H. S. ...	Asst. Adj. General.
Lieutenant ...	Grover, P. C. ...	1st Shropshire L. I.
Major ...	Guilding, E. L. ...	D. A. A. General.
Major ...	Guinness, E. ...	R. A.
Captain ...	Gunning, C. J. ...	1st Madras Pioneers.
Colonel ...	Gwatkin, F. S. ...	Mily. Secy. to H. E. the C-in-C.
Lieutenant ...	Hadow, A. L. ...	Norfolk Regt.
Lt.-Colonel ...	Haggard, C. ...	Royal Irish Rifles.
Colonel ...	Hailes, W. ...	Comdg. at Multan.
Lieutenant ...	Hall, H. C. ...	R. A.
Lieutenant ...	Hall, R. M. ...	13th Bengal Lancers.
Lieutenant ...	Hallet, R. L. H. ...	Royal Irish Rifles.

## ORDINARY MEMBERS—continued.

Rank.	Name.	Corps, &c.
Lieutenant ...	Hamer, M. A. ...	29th Bombay Infantry.
Captain ...	Hamilton, C. ...	2nd Bengal Infantry.
Col., C.B., D.S.O.,...	Hamilton, Ian S. M. ...	A. A. Genl., Ladysmith.
Major, D.S.O. ...	Hamilton, W. G. ...	D. A. A. General.
Col., v.c., C.B., D.S.O., A.-D.-C.	Hammond, A. G. ...	I. S. Corps.
Colonel, C.B. ...	Harley, G. E. ...	A. A. G., Belfast.
Lt.-Colonel ...	Harman, C. E. ...	2nd Connaught Rangers.
Captain ...	Harris, A. P. D. ...	17th Bengal Infantry.
Lt.-Colonel ...	Harris, C. W. ...	2nd Bengal Infantry.
Captain ...	Harrison, T. A. ...	Asst. Secy., Mily. Dept.
Colonel ...	Hart, H. H. ...	R. E.
Br.-Genl., v.c., K.C.B.	Hart, Sir R. C. ...	Comdg. Quetta Dist.
Captain ...	Harvest, H. de V. ...	Cant. Magistrate.
Surg.-Genl., C.B., D.S.O., M.D.	Harvey, R. ...	I. M. S.
Lt.-Colonel ...	Haughton, T. H. ...	20th Madras Infantry.
Lt.-Colonel ...	Hawkes, H. M. P. ...	Comy.-Genl. for Trans.
Captain ...	Hawkes, L. H. ...	2nd Welsh Regiment.
Lieutenant ...	Hawkes, R. ...	1st Bengal Infantry.
Lt.-Colonel ...	Hawkins, F. ...	1st Bengal Infantry.
Major ...	Hayden, F. A. ...	West Riding Regiment.

## ORDINARY MEMBERS—continued.

Rank.		Name.		Corps, &c.
Major	...	Hayes, C. H.	...	1st Bengal Lancers.
Captain	...	Hayes, R. H.	...	Middlesex Regiment.
Captain	...	Head, G.	...	1st Norfolk Regiment.
Captain	...	Heaven, F. G.	...	Madras Railway Vols.
Captain	...	Hefferman, H. W.	...	19th Madras Infantry.
Lt.-Colonel	...	Hegan, E.	...	Late 5th D. Guards.
Major	...	Hendley, H.	...	I. M. S.
Captain, D.S.O.	...	Henegan, J.	...	10th Madras Infantry.
Lt.-Colonel	...	Henriques, E. N.	...	R. A.
Colonel	...	Henry, G.	...	Comdg. at Rawal Pinli
Major	...	Herbert, C.	...	Political Agent.
Lt.-Colonel	...	Herbert, L.	...	C. I. Horse.
Lt.-Colonel	...	Hervey, H. dela M.	...	Comdg. at Delhi.
Lieutenant	...	Hickie, C. J.	...	1st Gloucestershire Regt.
Esquire, C.I.E.	...	Higham, T.	...	Public Works Dept.
Colonel, C.B.	...	Hill, W.	...	A. A. G. for Musketry.
Lieutenant	...	Hill, W. L. B.	...	1st Gloucestershire Regt.
Colonel	...	Hilliard, W. E.	...	Asst. Qr. Master Genl.
Lieutenant	...	Hilson, R. J.	...	31st Madras Infantry.
Lieutenant	...	Hislop, A. F.	...	5th Bombay Cavalry.
Maj.-Genl., C.B.	...	Hobday, T. F.	...	Comy.-Genl.-in-Chief.

## ORDINARY MEMBERS—continued.

No.	Rank.	Name.	Corps, &c.
Lancers	Esquire ...	Hodson, C. W. ...	Dy. Secy., P. W. D.
Regiment	Captain ...	Hodson, G. B. ...	Guides Infantry.
Regiment	Maj.-Genl., c.s....	Hogg, G. O. ...	I. S. Corps.
Way Vm	Lt.-Colonel ...	Hogge, O. ...	33rd Punjab Infantry.
Infantry	Lt.-Colonel, c.i.e.	Hogge, J. W. ...	14th Sikhs.
D. Guard	Captain ...	Hoghton, F. A. ...	1st Bombay Infantry.
	Captain ...	Holland, P. ...	4th Punjab Infantry.
Infantry	Captain ...	Holland-Pryor, P. ...	13th Bengal Lancers.
	Major ...	Holloway, E. L. ...	4th Madras Pioneers.
awal Pm	Lientenant ...	Holman, H. C. ...	16th Bengal Cavalry.
ent.	Captain ...	Home, J. M. ...	2-2nd Gurkha Rifles.
	Captain ...	Horsbrugh, R. P. ...	Dy. Commissioner.
Delhi.	Captain ...	Houison-Craufurd, J. A.	7th Bombay Infantry.
ershire Bg	Captain ...	Howell, E. R. ...	D. A. C. General.
s Dept.	Major ...	Howell, L. J. ...	16th Bengal Cavalry.
Musketry	Lientenant ...	Howell, P. ...	2nd Punjab Cavalry.
ershire Bg	Colonel ...	Howlett, A. ...	12th Madras Infantry.
aster Genl	Lientenant ...	Hudson, A. K. ...	17th Bengal Cavalry.
Infantry.	Captain ...	Hudson, T. R. C. ...	R. A.
Cavalry.	Lt.-Col., d.s.o. ...	Huggins, P. G. ...	21st Madras Infantry.
in-Chief	Lientenant ...	Hughes, C. C. A. A. ...	14th Bengal Lancers.



## ORDINARY MEMBERS—continued.

Rank.	Name.	Corps, &c.
Colonel	Exham, R.	R. A. M. C.
Captain	Fagan, H. B.	1st Punjab Infantry.
Lieutenant	Fagan, L. E.	6th Madras Infantry.
Lt.-Colonel	Faithfull, H. T.	31st Punjab Infantry.
Captain	Fane, V. B.	1st Punjab Cavalry.
Esq., C.S.I., C.S.	Fanshawe, A. U.	D.-G., Post Office in India.
The Hon'ble, C.S.	Fanshawe, H. C.	Commissioner.
Captain	Fasken, W. H.	10th Bengal Lancers.
Captain	Faulkner, A. A. M. M.	2nd Bombay Infantry.
Captain	Fayrer, J. O. S.	1-5th Gurkha Rifles.
Major	Fegen, M. F.	R. A.
Major	Fell, R. B.	1st Scottish Rifles.
Major, D.S.O.	Fendall, C. P.	R. A.
Lt.-Colonel	Fenton, A. B.	A. A. General.
Lieutenant	Fergusson, A. C.	R. A.
Captain	Fergusson, H. C.	2nd Bn. H. L. Infantry.
Lt.-Colonel, D.S.O.	Ferrier, J. A.	R. E.
Captain	Finch, C.	1st Bengal Lancers.
Captain	Finch, E. H. F.	D. A. A. G. for Musketry.
Major	Fink, G. H.	I. M. S.
Esq., C.S.I., C.S.	Finlay, J. F.	Secy., Finance Dept.

## ORDINARY MEMBERS—continued.

Rank.	Name.	Corps, &c.
Lt.-Colonel ...	Finnis, H. ...	R.E., D.A. A. G. for R.E.
Captain ...	Firth, E. W. A. ...	9th Madras Infantry.
Captain ...	Fisher, J. ...	2-2nd Gurkha Rifles.
Lt.-Colonel ...	FitzGerald, C. M. ...	A. O. General.
Captain ...	Fitz-Maurice, R. ...	R. A.
Captain ...	Foord, E. R. ...	Inspr., Mily. Accounts.
Captain ...	Forbes, L. A. ...	S. C.
Lt.-Colonel, c.B....	Forbes, W. E. G. ...	Royal War. Regt.
Captain ...	Ford, O. A. W. ...	4th Bombay Infantry.
Major ...	Forde, L. ...	R. A.
Captain ...	Forestier-Walker, C. E. ...	R. A.
Captain ...	Forth, C. T. W. ...	30th Punjab Infantry.
Lt.-Colonel ...	Foss, K. M. ...	26th Madras Infantry.
Captain ...	Fox-Strangways, T. S. ...	Royal Irish Rifles.
Col., C.I.E., Q.E.P.	Franklin, B. ...	I. M. S.
Captain ...	Fraser, L. D. ...	R. A.
Captain ...	Fraser, N. G. ...	4th Bombay Cavalry.
The Hon'ble, K.C.S.I.	Fryer, Sir F. W. B. ...	Lt.-Governor, Burma.
Major ...	Fuller, R. W. ...	R. A.
Lieutenant ...	Furse, G. A. ...	R. A.
Captain ...	Fyffe, B. O. ...	Gloucestershire Regt.

## ORDINARY MEMBERS—continued.

Rank.	Name.	Corps, &c.
Captain ...	Galloway, F. L. ...	B. A.
Lt.-Colonel ...	Gallwey, E. J. ...	2nd Somerset L. Infy.
Lt.-Colonel ...	Garbett, C. H. V. ...	2nd Bengal Lancers.
Lieutenant ...	Gardner, R. M. S. ...	Gloucestershire Regt.
Lieutenant ...	Garratt, H. S. ...	3rd Bombay Infantry.
Lt.-Colonel ...	Gartside-Tipping, R. F.	1st Bengal Lancers.
Br.-Genl., K.O.B., A.-D.-C.	Gaselee, Sir A. ...	Offg. Q. M. G. in India.
Lt.-Colonel ...	Gastrell, G. D. C. ...	8th Bengal Infantry.
Lt.-Genl., K.O.B., D.S.O.	Gatacre, Sir W. F. ...	Comdg. 3rd Division, S. Africa.
Lieutenant ...	Gaussen, A. W. D. ...	2nd High. Lt. Infantry.
Major ...	Gawne, J. M. ...	Royal Lancaster Regt.
Lt.-Colonel ...	Gibbs, M. I. ...	31st Punjab Infantry.
Captain ...	Giles, A. ...	13th Bengal Infantry.
Captain ...	Glasgow, W. J. T. ...	R. West Surrey Regt.
Lt.-Colonel ...	Glennie, E. ...	R. E.
Lt.-Colonel ...	Goad, H. ...	Dir., Army Remount Department.
Captain ...	Godfrey, S. H. ...	Sett. Comr., Kashmir.
Lieutenant ...	Godwin, O. A. C. ...	3rd Punjab Cavalry.
Captain ...	Goodridge, W. S. ...	R. N., Dir., R. I. Marine.

## ORDINARY MEMBERS—continued.

Rank.	Name.	Corps, &c.
Colonel, O.I.E. ...	Gordon, J. C. F. ...	I. S. Corps.
Captain ...	Gordon, J. L. R. ...	15th Sikhs.
Captain ...	Gordon, Lincoln ...	Oudh Vol. Rifles.
Colonel ...	Gordon, R. ...	I. S. Corps.
Major ...	Gordon, S. D. ...	D. A. A. General.
Captain ...	Gordon, W. E. ...	1st Gordon Highlanders.
Lt.-Colonel ...	Gore, St. J. O. ...	5th Dragoon Guards.
Major ...	Gough, S. C. ..	5th Bengal Cavalry.
Major, D.S.O. ...	Graham, H. W. G. ...	5th Lancers.
Captain ...	Graham, M. D. ...	Northamptonshire Regt.
Colonel ...	Grant, H. G. ...	U. Active List.
Maj.-Genl., C.B. ...	Grant, H. F. ...	I. G. Cavalry, England.
Colonel ...	Grant, Jas. ...	S. C.
Lt.-Colonel ...	Grant, S. ...	B. E.
Major ...	Grant, S. G. ...	Scottish Rifles.
Captain ...	Grant-Duff, A. ...	Royal Highlanders.
Colonel, O.B. ...	Graves, B. C. ...	S. C.
Lt.-Colonel ...	Gray, W. du G. ...	1st Punjab Infantry.
Lt.-Colonel ...	Greenfield, R. M. ...	A. A. General.
Captain ...	Greenhill-Gardyne, A. D.	Gordon Highlanders.
Major ...	Grey, A. ...	Punjab Light Horse.

## ORDINARY MEMBERS—continued.

Rank.		Name.		Corps, &c.
Captain	...	Grey, W. G.	...	3rd Madras Infantry.
Esquire, C.I.E.	...	Griesbach, O. L.	...	Dir., Geological Survey of India.
Captain	...	Griffith, G. H.	...	R. E.
Lieutenant	...	Grimley, W. M.	...	Asst. Military Accott.
Captain	...	Grimshaw, E. W.	...	24th Madras Infantry.
Captain	...	Grimston, R. E.	...	6th Bengal Cavalry.
Captain	...	Grimston, S. B.	...	18th Bengal Lancers.
Lieutenant	...	Grove, H. M.	...	S. C.
Lt.-Colonel	...	Grover, M. H. S.	...	Asst. Adj. General.
Lieutenant	...	Grover, P. C.	...	1st Shropshire L. I.
Major	...	Guilding, E. L.	...	D. A. A. General.
Major	...	Guinness, E.	...	R. A.
Captain	...	Gunning, C. J.	...	1st Madras Pioneers.
Colonel	...	Gwatkin, F. S.	...	Mily. Secy. to H. E. the C-in-C.
Lieutenant	...	Hadow, A. L.	...	Norfolk Regt.
Lt.-Colonel	...	Haggard, C.	...	Royal Irish Rifles.
Colonel	...	Hailes, W.	...	Comdg. at Multan.
Lieutenant	...	Hall, H. C.	...	R. A.
Lieutenant	...	Hall, R. M.	...	13th Bengal Lancers.
Lieutenant	...	Hallet, R. L. H.	...	Royal Irish Rifles.

## ORDINARY MEMBERS—continued.

Rank.	Name.	Corps, &c.
Lieutenant ...	Hamer, M. A. ...	29th Bombay Infantry.
Captain ...	Hamilton, C. ...	2nd Bengal Infantry.
Col., C.B., D.S.O.,...	Hamilton, Ian S. M. ...	A. A. Genl., Ladysmith.
Major, D.S.O. ...	Hamilton, W. G. ...	D. A. A. General.
Col., V.C., C.B., D.S.O., A.-D.-C.	Hammond, A. G. ...	I. S. Corps.
Colonel, C.B. ...	Harley, G. E. ...	A. A. G., Belfast.
Lt.-Colonel ...	Harman, C. E. ...	2nd Connaught Rangers.
Captain ...	Harris, A. P. D. ...	17th Bengal Infantry.
Lt.-Colonel ...	Harris, C. W. ...	2nd Bengal Infantry.
Captain ...	Harrison, T. A. ...	Asst. Secy., Mily. Dept.
Colonel ...	Hart, H. H. ...	R. E.
Br.-Genl., V.C., K.C.B.	Hart, Sir R. C. ...	Comdg. Quetta Dist.
Captain ...	Harvest, H. de V. ...	Cant. Magistrate.
Surg.-Genl., C.B., D.S.O., M.D.	Harvey, R. ...	I. M. S.
Lt.-Colonel ...	Haughton, T. H. ...	20th Madras Infantry.
Lt.-Colonel ...	Hawkes, H. M. P. ...	Comy.-Genl. for Trans.
Captain ...	Hawkes, L. H. ...	2nd Welsh Regiment.
Lieutenant ...	Hawkes, R. ...	1st Bengal Infantry.
Lt.-Colonel ...	Hawkins, F. ...	1st Bengal Infantry.
Major ...	Hayden, F. A. ...	West Riding Regiment.

## ORDINARY MEMBERS—continued.

Rank.		Name.		Corps, &c.
Major	...	Hayes, C. H.	...	1st Bengal Lancers.
Captain	...	Hayes, B. H.	...	Middlesex Regiment.
Captain	...	Head, G.	...	1st Norfolk Regiment.
Captain	...	Heaven, F. G.	...	Madras Railway Vols.
Captain	...	Heffernan, H. W.	...	19th Madras Infantry.
Lt.-Colonel	...	Hegan, E.	...	Late 5th D. Guards.
Major	...	Hendley, H.	...	I. M. S.
Captain, D.S.O.	...	Henegan, J.	...	10th Madras Infantry.
Lt.-Colonel	...	Henriques, E. N.	...	R. A.
Colonel	...	Henry, G.	...	Comdg. at Rawal Pindi.
Major	...	Herbert, O.	...	Political Agent.
Lt.-Colonel	...	Herbert, L.	...	C. I. Horse.
Lt.-Colonel	...	Hervey, H. dela M.	...	Comdg. at Delhi.
Lieutenant	...	Hickie, C. J.	..	1st Gloucestershire Regt.
Esquire, C.I.E.	...	Higham, T.	...	Public Works Dept.
Colonel, C.B.	...	Hill, W.	...	A. A. G. for Musketry.
Lieutenant	...	Hill, W. L. B.	...	1st Gloucestershire Regt.
Colonel	...	Hilliard, W. E.	...	Asst. Qr. Master Genl.
Lieutenant	...	Hilson, R. J.	...	31st Madras Infantry.
Lieutenant	...	Hislop, A. F.	...	5th Bombay Cavalry.
Maj.-Genl., C.B.	...	Hobday, T. F.	...	Comy.-Genl.-in-Chief.

## ORDINARY MEMBERS—continued.

Rank.	Name.	Corps, &c.
Esquire ...	Hodson, C. W. ...	Dy. Secy., P. W. D.
Captain ...	Hodson, G. B. ...	Guides Infantry.
Maj.-Genl., c.B....	Hogg, G. O. ...	I. S. Corps.
Lt.Colonel ...	Hogge, O. ...	33rd Punjab Infantry.
Lt.Colonel, c.I.B.	Hogge, J. W. ...	14th Sikhs.
Captain ...	Hoghton, F. A. ...	1st Bombay Infantry.
Captain ...	Holland, P. ...	4th Punjab Infantry.
Captain ...	Holland-Pryor, P. ...	13th Bengal Lancers.
Major ...	Holloway, E. L. ...	4th Madras Pioneers.
Lieutenant ...	Holman, H. C. ...	16th Bengal Cavalry.
Captain ...	Home, J. M. ...	2-2nd Gurkha Rifles.
Captain ...	Horsbrugh, R. P. ...	Dy. Commissioner.
Captain ...	Houison-Craufurd, J. A.	7th Bombay Infantry.
Captain ...	Howell, E. R. ...	D. A. C. General.
Major ...	Howell, L. J. ...	16th Bengal Cavalry.
Lieutenant ...	Howell, P. ...	2nd Punjab Cavalry.
Colonel ...	Howlett, A. ...	12th Madras Infantry.
Lieutenant ...	Hudson, A. K. ...	17th Bengal Cavalry.
Captain ...	Hudson, T. R. C. ...	R. A.
Lt-Col., D.S.O. ...	Huggins, P. G. ...	21st Madras Infantry.
Lieutenant ...	Hughes, C. C. A. A. ...	14th Bengal Lancers.



## ORDINARY MEMBERS—continued.

Rank.		Name.		Corps, &c.
Major	...	Hughes, F. T. C.	...	Erinpura Irregular Force.
Major	...	Hume, C. V.	...	R. A.
Major	...	Humphrey, S.	...	1st Gloucestershire Regt.
Major	...	Hutchins, H. L.	...	A. C. General.
Lieutenant	...	Hutchinson, C. A. R.	...	3rd Sikh Infantry.
Lieutenant	...	Hutchinson, C. G.	...	33rd Madras Infantry.
Colonel	...	Hutchinson, H. D.	...	Dir., Mily. Edn. in India.
Captain	...	Ievers, O. G.	...	Cant. Magistrate.
Captain	...	Iggulden, H. A.	...	2nd Derby. Regt.
Lt.-Colonel	...	Iremonger, R. G.	...	33rd Madras Infantry.
Major	...	Ivatt, G. A.	...	Lincolnshire Regt.
Major	...	Jackson, J.	...	9th Madras Infantry.
Captain	...	Jacob, C. W.	...	24th Bombay Infantry.
Captain	...	Jacob, H. F.	...	Asst. Pol. Agent.
Lt.-Colonel	...	James, L. H. S.	...	Late R. A.
Captain	...	James, W. B.	...	2nd Bengal Lancers.
Br.-Genl., C.B.	...	Jeffreys, P. D.	...	Comdg. Narbada Dist.
Major	...	Jellett, J. H.	...	R. A.
Maj.-Genl., C.B.	...	Jennings, R. M.	...	Comdg. Oudh District.
Captain	...	Jermyn, T.	...	D. A. A. General.
Lieutenant	...	Jerram, H.	...	Asst. D., Mily. Edn. in India.

## ORDINARY MEMBERS—continued.

Rank.		Name.		Corps, &c.
Colonel	...	Jerrard, F. B. J.	...	Asst. Adj. General.
Major	...	Johnson, F. E.	...	R. A.
Captain	...	Johnstone, A. A. J.	...	D. A. Q. M. G., I. B.
Major	...	Johnstone, B. A.	...	1st Madras Pioneers.
Lt.-Colonel	...	Jones, A. E.	...	32nd Punjab Pioneers.
Captain, D.S.O.	...	Jones, H. J.	...	14th Bengal Infantry.
Captain	...	Jordan, R. P.	...	1st Gloucestershire Regt.
Major	...	Justice, C. Le G.	...	12th Bengal Infantry.
Lt.-Col., D.S.O.	...	Keary, H. D'U.	...	31st Madras Infantry.
Major	...	Keato, C. R.	...	31st Madras Infantry.
Lieutenant	...	Keddie, H. W. G.	...	R. A.
Major, D.S.O.	...	Keene, A.	...	R. A.
Lieutenant	...	Keily, E. W.	...	25th Madras Infantry.
Major	...	Keir, J. L.	...	R. A.
Lt.-Colonel	...	Kekewich, R. G.	...	North Lancashire Regt.
Col., C.B., A.-D.-C.	...	Kelly, J. G.	...	Comdg. at Sialkot.
Lt.-Colonel	...	Kemball, G. V.	...	R. A. W. African Front. Force.
Lieutenant	...	Kennedy, W. M.	...	Asst. Commissioner.
Captain	...	Kennion, R. L.	...	Asst. Political Agent.
Captain	...	Kenny, H. T.	...	Offg. Asst. Secy., M. D.
Lieutenant	...	Kenrick, G. E. R.	...	Royal W. Surrey Regt.

## ORDINARY MEMBERS—continued.

Rank.		Name.		Corps, &c.
Captain	...	King, A. B.	...	2nd Royal Irish Regt.
Esquire	...	Kirk, H. A.	...	Dir. of Telegraphs.
Captain	...	Kirkpatrick, W.	...	1st Punjab Infantry.
Colonel	...	Kitchener, F. W.	...	West Yorkshire Regt.
Captain	...	Knapp, K. K.	..	R. A.
Lieutenant	...	Knox, A. W. F.	...	5th Punjab Infantry.
Lieutenant	...	Knox, C. S.	...	1st Gloucestershire Regt.
Major	...	Kreyer, F. A. C.	...	Cant. Magistrate.
Captain	...	Laing, F. C.	...	12th Bengal Infantry.
Colonel	...	Lake, P. H. N.	...	A. A. Genl., Mob., W. O.
Lieutenant	...	Lambert, W. J.	...	2nd Lancers, H. C.
Lieutenant	...	Lance, F. F. H.	...	19th Bengal Lancers.
Major	...	Langley, J. P.	...	R. A.
Lieutenant	...	Lash, A. O.	...	13th Bombay Infantry.
Captain	...	Lathbury, H. O.	...	R. E.
Esquire, C.I.B.	...	Lawrence, W. R.	...	Pte. Secy. to H. E. the Viceroy.
Br.-Gl., C.B., D.S.O.		Leach, H. P.	...	Comdg. Presidency Dist.
Colonel	...	Leckie, F. W. V.	...	S. O.
Esquire	...	Lees, O. C.	...	P. W. Dept.
Col., Bart., C.B.	...	Leslie, Sir C. H.	...	I. S. Corps.
Major	...	Ley, W. G.	...	1st N. Staffordshire Regt.

## ORDINARY MEMBERS—continued.

Rank.	Name.	Corps, &c.
Captain ...	Lightfoot, T. W. ...	8th Bengal Infantry.
Major ...	Lindesay, E. ...	2nd Royal Irish Regt.
Major ...	Little, C. B. ...	Somersetshire L. I.
Captain ...	Lloyd, W. E. E. ...	4th Infantry, H. C.
H. E. Genl., G.C.B., K.C.S.I.	Lockhart, Sir W. S. A.	Commander-in-Chief in India.
Major ...	Long, S. S. ...	Army Service Corps.
Captain ...	Loudon, J. A. ..	13th Madras Infantry.
Maj.-Genl., C.B., C.S.I.	Lovett, B. ...	Late R. E.
Lt.-Genl., G.C.B.	Low, Sir R. C. ...	Commanding the Forces, Bombay.
Lieutenant ...	Lewis, P. S. ...	R. A.
Captain, M.B. ...	Luard, H. B. ...	I. M. S.
Lieutenant ...	Lubbock, G. ...	R. E.
Major, D.S.O. ...	Lucas, F. G. ...	2-5th Gurkha Rifles.
Captain ...	Luck, C. A. ...	2nd Punjab Cavalry.
Lt.-Genl., K.C.B.	Luck, Sir G. ...	Commanding the Forces, Bengal.
Colonel ...	Lugard, H. T. ...	R. A.
Major ...	Lumley, F. D. ...	Middlesex Regiment.
Major ...	Lumsden, H. R. W. ...	3rd Bengal Infantry.
Captain ...	Lyne, C. V. N. ...	16th Madras Infantry.
Lieutenant ...	Lyon, J. W. H. ...	25th Madras Infantry.

## ORDINARY MEMBERS—continued.

Rank.	Name.	Corps, &c.
Major ...	Lyster, A. W. ...	I. S. Corps.
Lt.-Colonel, M.D.	McCartie, C. J. ...	I. M. S.
Captain ...	McConaghey, H. ...	7th Bengal Cavalry.
Captain ...	McDermott, J. ...	2nd P. V. Rifles.
Major ...	McIntyre, H. D. ...	8th Madras Infantry.
Lieutenant ...	McNeile, D. H. ...	19th Bengal Lancers.
Captain ...	McPherson, J. ...	Ordnance Department.
Lt.-Colonel, D.S.O.	McSwiney, E. F. H. ...	1st Lancers, H. O.
Lieutenant ...	McVean, D. A. D. ...	45th Sikhs.
Captain ...	Macalpine-Leny, R. L.	16th Lancers.
Captain ...	Macandrew, H. J. M.	5th Bengal Cavalry.
Lieutenant ...	Macaulay, D. I. M. ...	1st Bengal Lancers.
Lt.-Colonel ...	Macdonald, J. R. L. ...	R. E.
The Hon'ble, G.C.S.I.	MacDonnell, Sir A. P.	Lt.-Govr., N.-W. P. and Oudh.
Br.-Genl., C.B., D.S.O.	MacGregor, C. R. ...	Comdg. Assam Dist.
Major ...	Mackenzie, C. J. ...	Seaforth Highs.
Major ...	Mackenzie, K. R. ...	2nd Seaforth Highs.
Captain ...	Mackenzie, R. J. H. L.	R. E.
Lt.-Colonel ...	Mackenzie-Kennedy, E. C. W.	1st Madras Pioneers.
Lieutenant ...	MacLachlan, T. R. ...	40th Pathans.
Lieutenant ...	Maclean, A. H. ...	A. and S. Highlanders.

## ORDINARY MEMBERS—continued.

Rank.	Name.	Corps, &c.
Captain, D.S.O. ...	MacMunn, G. F. ...	R. A.
Captain ...	Macready, C. F. N. ...	Gordon Highlanders.
Lieutenant ...	Madden, T. E. ...	17th Bengal Infantry.
Major ...	Mahon, R. H. ...	R. A.
Lt.-Colonel ...	Maisey, F. C. ...	30th Punjab Infantry.
Maj.-Genl., C.B. ...	Maitland, P. J. ...	Secy. to Govt., M. D.
Captain ...	Major, F. F. ...	1st Infantry, H. C.
Captain ...	Malcolm, P. ...	2-4th Gurkha Rifles.
Lieutenant ...	Mansel, H. A. ..	1st Dorsetshire Regt.
Lt.-Colonel ...	Mansfield, H. ...	Asst. Comy.-Genl.
Captain ...	Mardall, W. S. ...	17th Bengal Cavalry.
Lieutenant ...	Marindin, A. H. ...	1st Royal Highlanders.
Major ...	Marriott, E. F. ...	I. S. Corps.
Major-General ..	Marsh, F. H. B. ...	U. Sup. List.
Maj.-Genl., C.I.E. ...	Marshall, G. F. L. ...	Late R. E.
Captain ...	Marshall, T. E. ...	R. A.
Lt.-Colonel ...	Martin, A. R. ...	D. A. G. in India.
Lt.-Colonel ...	Martin, M. ...	R. E.
Captain ...	Massie, R. H. . ...	R. A.
Lt.-Col., C.I.E., V.D. ...	Masson, D. P. ...	1st P. V. Rifles.
Captain ...	Massy, G. ...	Norfolk Regiment.

## ORDINARY MEMBERS—continued.

Rank.		Name.		Corps, &c.
Major	...	Massy, H. S.	...	19th Bengal Lancers.
Lt.-Colonel	...	Masters, A.	...	2nd C. I. Horse.
Captain	...	Maurice, F. B.	...	Derbyshire Regiment.
Lieutenant	...	Maxwell, D. W.	...	16th Madras Infantry.
Major	...	Maxwell, G. W.	...	A. A. General.
Captain	...	Maxwell, H. G.	...	16th Bengal Cavalry.
Major	...	Maxwell, N.	...	R. A.
Lt.-Colonel	...	Maxwell, E. C.	...	R. E.
Major	...	Mayhew, H. S.	...	Border Regiment.
Major	...	Mayne, C. B.	...	R. E.
Lt.-Colonel, C.B....		Mayne, R. C. G.	...	30th Bombay Infantry.
Lt.-Colonel	...	Meade, J. W. B.	...	3rd Lancers, H. C.
Lt.-Colonel, C.I.E.		Meade, M. J.	...	Political Agent.
Lieutenant	...	Mears, A. ...	...	I. S. Corps.
Captain	...	Medley, A. G.	...	D. A. A. General.
Major	...	Medley, E. J.	...	17th Bengal Cavalry.
Br.-Genl., K.O.B., C.M.G.		Meiklejohn, Sir W. H.		Comdg. Rohilkhand Dist.
Lieutenant	...	Melliss, F. G.	...	13th Bombay Infantry.
Colonel, K.C.S.I....		Melliss, Sir H.	...	I. G., Imp. Service Troops.
Major, M.B.	...	Melville, C. H.	...	R. A. M. Corps.
Major	...	Melville, J. S.	...	4th Bengal Infantry.

## ORDINARY MEMBERS—continued.

Rank.	Name.	Corps, &c.
Captain ...	Mercer, W. H. W. ...	26th Madras Infantry.
Esquire ...	Meredith, A. ...	Deputy Commissioner.
Br.-General ...	Michell, St. J. F. ...	Comdg. Allahabad Dist.
Captain ...	Miles, P. J. ...	4th Punjab Infantry.
Colonel, c.s.i. ...	Miley, J. A. ...	Actt. Genl., M. Dept.
Captain ...	Millar, W. H. ...	27th Punjab Infantry.
Major, d.s.o. ...	Miller-Wallnutt, C. C. ...	2nd Gordon Higha.
Captain, s.o. ...	Moberly, F. J. ...	37th Bengal Infantry.
Lt.-Colonel ...	Monck-Mason, G. G. ...	R. A.
Major ...	Money, A. W. ...	R. A.
Colonel, c.B. ...	Money, E. A. ...	I. S. Corps.
Lt.-Colonel ...	Money, G. A. ...	18th Bengal Lancers.
Lt.-Colonel ...	Money, G. E. ...	C. I. Horse.
Captain ...	Money-Shewan, R. E. ...	R. E.
Lieutenant ...	Monreal, G. ...	Wiltshire Regiment.
Major ...	Mongtomery, C. A. S. ...	1st Bombay Grenadiers.
Lt.-Colonel ...	Mongtomery, J. A. L. ...	Sett. Commissioner.
Major ...	Moore, G. H. J. ...	Malwa Bhil Corps.
Br.-General, d.s.o. ...	More-Molynaux, G. H. ...	Comdg. Bundelkhand Dist.
Lieutenant ...	Morris, R. L. ...	3rd Bengal Cavalry.
Major ...	Morris, W. A. ...	R. A. M. C.



## ORDINARY MEMBERS—continued.

Rank.	Name.	Corps, &c.
Lt.-Colonel ...	Morrison, R. H. ...	Late 18th Hussars.
Captain ...	Morton, E. R. ...	31st Punjab Infantry.
Major-General, K.C.I.E., C.B.	Morton, Sir G. de C. ...	Comdg. Lahore Dist.
Captain ...	Moulton-Barrett, H. P.	2nd A. & S Highs,
Major ...	Mullaly, H. ...	R. E.
Captain ...	Mullins, W. B. ...	27th Punjab Infantry.
Colonel ...	Murray, J. W. ...	R. A., A. Q. M. G., I. B.
Lt.-Colonel, M.B....	Murray, R. D. ...	I. M. S.
Major ...	Muspratt-Williams, C.A.	R. A.
Captain ...	Nairne, E. S. ...	R. A.
Lieutenant ...	Nangle, K. E. ...	3rd Infantry, H. C.
Captain the Hon'ble.	Napier, H. D. ...	C. I. Horse.
Captain ...	Napier, G. S. F. ...	Staff Captain, I. B.
Lt.-Colonel ...	Nedham, E. M. ...	Cant. Magistrate.
Captain ...	Neilson, W. ...	Late High. L. Infy.
Lt.-Colonel, M.B....	Nelis, J. A. ...	I. M. S.
Captain ...	Nethersole, A. R. ...	27th Madras Infantry.
Captain ...	Nethersole, F. R. ...	Assistant Commissioner.
Colonel ...	Neville, J. P. C. ...	Asst. Qr. Mr. General.
Major ...	Newell, W. J. ...	8th Bengal Infantry.
Lt.-Colonel ...	Newill, J. H. ...	Political Agent.

## ORDINARY MEMBERS—continued.

Rank.	Name.	Corps, &c.
General ...	Nicholl, T. ...	Late R. A.
Captain ...	Nicholls, A. ...	2nd Punjab Infantry.
Maj.-Genl., K.C.B.	Nicholson, Sir W. G. ...	Adj't. Genl. in India.
Lt.-Genl., C.B. ...	Nicolson, M. H. ...	Comdg. Mhow Dist.
Lieutenant ...	Nistet, F. C. ...	1st Gloucestershire Regt.
Colonel ...	Nixon, J. E. ...	Asst. Qr. Mr. General.
Captain ...	Noblett, L. H. ...	Royal Irish Rifles.
Major ...	Norie, C. E. deM. ...	1-2nd Gurkha Rifles.
Captain ...	Norman, H. H. ...	Northamptonshire Regt.
Captain ...	Norman, W. W. ...	2nd Punjab Cavalry.
Lieutenant ...	Nutfall, J. R. ...	44th Gurkha Rifles.
Captain ...	O'Connor, W. F. T. ...	R. A.
Major ...	O'Donnell, G. B. ...	Asst. Pol. Agent.
Major ...	O'Donoghue, M. E. ...	15th Madras Infantry.
Esquire ...	O'Dwyer, M. F. ...	C. S.
Major ...	O'Leary, T. E. ...	1st Royal Irish Fusiliers.
Major ...	O'Neill, W. H. ...	R. A.
Lt. Colonel ...	O'Sullivan, G. H. W. ...	R. E., A. A. General.
Captain ...	Ogg, G. S. ...	R. A.
Captain ...	Oldfield, C. G. ...	R. A.
Lieutenant ...	Oldfield, T. A. F. R. ...	Asst. Political Agent.

## ORDINARY MEMBERS—continued.

Rank.	Name.	Corps, &c.
Major ...	Ommanney, G. S. ...	1-1st Gurkha Rifles.
Major ...	Ormerod, G. S. ...	2nd Royal Muns. Fus.
Colonel, C.I.E. ...	Ottley, J. W. ...	R. E.
Major ...	Ovens, G. H. ...	2nd Border Regt.
Captain ...	Owen, F. C. ...	R. A.
Lt.-Colonel ...	Owen, R. ...	21st Hussars.
Colonel ...	Paley, E. G. ...	Late 18th Hussars.
General, K.C.B. ...	Palmer, Sir A. P. ...	Commanding the Forces, Punjab.
Captain ...	Palmer, H. I. E. ...	5th Punjab Cavalry.
Captain ...	Parker, N. T. ...	6th Bengal Infantry.
Lt.-Colonel ...	Parkinson, J. R. ...	Hampshire Regiment.
Major ...	Parsons, C. G. ...	Comr. of Excise.
Esquire, C.I.E. ...	Patterson, A. B. ...	C. S.
Lt.-Colonel ...	Patterson, G. ...	Wyde Bay Mounted In- fantry, Queensland De- fence Forces.
Captain ...	Patterson, H. McN. ...	5th Bengal Cavalry.
Major ...	Paule, E. T. ..	D. A. A. General.
Major, D.S.O. ...	Payne, R. L. ...	1st Somerset. L. Infy.
Captain ...	Peach, E. ...	3rd Madras Infantry.
Esquire ...	Peacock, E. B. ...	I. C. Service.
Colonel, C.M.G. ...	Peacocke, W. ...	R. E., D. Q. M. General.
Lieutenant ...	Peart, C. L. ...	9th Madras Infantry.

## ORDINARY MEMBERS—continued.

Rank.		Name	Corps, &c.
Lt.-Colonel	...	Pennington, R. L. A. ...	Northumberland Fus.
Br.-General	...	Penton, H. E. ...	Comdg. Nagpore Dist.
Captain	...	Perkins, J. C. C. ...	Mily. Accts. Dept.
Captain, C.M.G.	...	Peyton, W. J. ...	7th Bombay Lancers.
Captain	...	Philipps, I. ...	1-5th Gurkha Rifles.
Lt.-Colonel	...	Phillips, C. R. ...	19th Bombay Infantry.
Lieutenant	...	Phillips, R. S. ...	2nd Sikh Infantry.
Captain	...	Pickard, F. B. B. ...	1st Royal W. S. Regt.
Captain	...	Pierce, F. G. ...	9th Madras Infantry.
Lt.-Colonel	...	Piers, W. B. ...	3rd Bombay Infantry.
Captain	...	Pigou, F. H. ...	1st Infantry, H. C.
Major	...	Pinney, R. J. ...	D. A. A. General.
Major	...	Pirie, C. P. W. ...	18th Bengal Lancers.
Esquire, C.I.E.	...	Pitman, C. E. ...	D.-G., Telghs. in India.
Captain	...	Playfair, A. ...	Asst. Commissioner.
Colonel	...	Plowden, F. H. ...	2nd Ox. L. Infantry.
Major	...	Pollard, W. C. ...	15th Bengal Lancers.
Major	...	Pollock, F. G. ...	7th Bengal Cavalry.
Lieutenant	...	Popham, E. L. ...	1st Madras Lancers.
Colonel	...	Porter, A. R. ...	28th Punjab Infantry.
Lt.-Colonel	...	Porter, H. E. ...	24th Madras Infantry.

## ORDINARY MEMBERS—continued.

Rank.		Name.		Corps, &c.
Esquire	...	Potter, C. D.	...	Survey Department.
Captain	...	Potts, F.	...	R. A.
Captain	...	Powell, A. L.	...	19th Hussars.
Captain	...	Powell, S. H.	...	R. E.
Captain	...	Powell, W. B.	...	9th Madras Infantry.
Lieutenant	...	Prentis, W. S.	...	29th Madras Infantry.
Captain	...	Pressey, A.	...	4th Bengal Infantry.
Major, D.S.O.	...	Preston, J. E.	...	S. Corps.
Lt.-Colonel	...	Prichard, G. P. M.	...	7th Madras Infantry.
Colonel	...	Prickett, T.	...	A. A. General.
Lt.-Colonel	...	Pringle, A.	...	I. S. Corps.
Lieutenant	...	Prissick, C.	...	26th Madras Infantry.
Colonel	...	Pulley, C.	...	1-3rd Gurkha Rifles.
Major	...	Purvis, A. B.	...	R. A.
Lt.-Colonel	...	Quentin, W.	...	4th Bombay Infantry.
Major	...	Radcliff, S. G.	...	33rd Madras Infantry.
Lt.-Colonel	...	Radcliffe, A. W. T.	...	14th Sikhs.
Lieutenant	...	Radice, A. H.	...	1st Gloucestershire Regt.
Major	...	Rainey-Robinson, R. M.	...	12th Madras Infantry.
Lt.-Colonel	...	Ramsay, J. G.	...	24th Punjab Infantry.
Major	...	Ramsden, H. F. S.	...	Mily. Accounts Dept.

## ORDINARY MEMBERS—continued.

Rank.		Name.		Corps, &c.
Captain	...	Randolph, F. A.	...	R. A.
Major	...	Ranken, G. P.	...	24th Punjab Infantry.
Colonel	...	Ranking, W. L.	...	U. Sup. List.
Major	...	Ravenshaw, H. A.	...	26th Punjab Infantry.
Captain	...	Rawlins, G. W.	...	12th Bengal Cavalry.
Lieutenant	...	Rawson, R. I.	...	1st Gloucestershire Regt.
Br.-Genl., c.B.	...	Reid, A. J. F.	...	Comdg. Malakand Force.
Esquire	...	Rendell, T. H.	...	Survey Department.
Captain	...	Rennick, F.	...	40th Pathans.
Captain	...	Reynolds, T. G. C.	...	2nd Royal Innis. Fus.
Captain	...	Ricketts, L. H.	...	12th Madras Infantry.
Lt.-Colonel	...	Riddell, W. H.	...	1st Bedfordshire Regt.
Major	...	Rideout, F. C. W.	...	A. O. General.
Colonel, v. c.	...	Ridgeway, B. K.	...	Asst. Adj. General.
Captain	...	Rigby, G. O.	...	Wiltshire Regt.
Colonel, c.M.G.	...	Rind, A. T. S. A.	...	I. S. Corps.
Major	...	Rippon, G.	...	29th Madras Infantry.
The Hon'ble, c.S.I.	...	Rivaz, C. M.	...	Member of the Viceregal Council.
Lt. the Hon'ble...	...	Roberts, F. H. S.	...	1st King's R. Rifles.
Captain	...	Roberts, H. L.	...	1st Bengal Lancers.
Esquire	...	Robertson, F. A.	...	C. Service.

## ORDINARY MEMBERS—continued.

Rank.	Name.	Corps, &c.
Captain ...	Robertson, G. A. ...	Staff Captain, I. B.
Captain ...	Robertson, P. R. ...	1st Scottish Rifles.
Captain, D.S.O. ...	Robertson, W. R. ...	3rd Dragoon Guards.
Lt.-Colonel ...	Robinson, G. H. ...	2-1st Gurkha Rifles.
Lt.-Colonel ...	Rochfort, A. N. ...	R. A.
Major ...	Rodwell, E. H. ...	D. A. A. G. for Instn.
Major ...	Rodgers, J. B. Leslie...	Dehra Dun M. Rifles.
Lieutenant ...	Rolland, E. L. ...	9th Madras Infantry.
Captain ...	Roome, R. E. ...	6th Bombay Cavalry.
Captain, C.I.B. ...	Roos-Keppel, G. O. ...	Asst. Commissioner.
Major ...	Rose, H. ...	1-3rd Gurkha Rifles.
Colonel, D.S.O. ...	Rose, H. M. ...	27th Punjab Infantry.
Colonel ...	Ross, T. F. ...	2nd Royal Scots.
Lieutenant ...	Rouse, A. H. T. ...	1st Madras Pioneers.
Captain ...	Rouse, H. ...	R. A.
Colonel ...	Routh, W. R. ...	A. A. General.
Major, D.S.O. ...	Rowcroft, G. F. ...	15th Sikhs.
Captain ...	Rowley, F. G. M. ...	Middlesex Regt.
Lieutenant ...	Ruck, J. E. ...	1st Gloucestershire Regt.
Lieutenant ...	Rundall, A. M. ...	Bedfordshire Regt.
Lt.-Colonel, D.S.O.	Rundall, F. M. ...	1-4th Gurkha Rifles.

## ORDINARY MEMBERS—continued:

Rank.	Name.	Corps, &c.
Lt.-Genl., K.C.B., K.C.M.G.	Russel, Sir B. C. ...	Comdg. Southern Dist., England.
Major ...	Rycroft, W. H. ...	11th Hussars.
Lieutenant ...	Salkeld, R. E. ...	2nd Oxfordshire L. I.
Captain ...	Salvesen, O. E. ...	R. E., B. S. and Miners.
Captain ...	Samson, L. L. B. ...	Lancashire Fus.
Lt.-Colonel ...	Sandback, A. E. ...	R. E.
Major ...	Sanders, F. A. ...	1st R. Inns. Fus.
Captain ...	Sartorious, G. O. F. ...	19th Bombay Infantry.
Lt.-Colonel ...	Saunders, M. W. ...	R. A., A. A. General.
Lieutenant ...	Sawyer, G. H. ...	23rd Punjab Pioneers.
Lt.-Colonel, C.I.E., D.S.O.	Scallan, R. I. ...	23rd Bombay Rifles.
Colonel, C.B. ...	Scott, C. H. ...	R. A., I.-G., Ordnance.
Lt.-Colonel ...	Scott, W. A. ...	Gordon Highlanders.
Lieutenant ...	Scott-Elliot, C. R. ...	4th Madras Pioneers.
Captain ...	Scrase-Dickens, S. W.	2nd Highland L. Infy.
Captain ...	Searle, O. T. A. ...	36th Sikhs.
Captain ...	Selwyn, O. H. ...	Asst. Secy., M. Dept.
Captain ...	Senior, H. W. R. ...	20th Punjab Infantry.
Major ...	Sewell, J. H. ...	Retired.
Captain ...	Shadwell, L. J. ...	D. A. A. G. for Instn.
Captain ...	Shakespear, L. W. ...	Assam, Military Police.



## ORDINARY MEMBERS—continued.

Rank.		Name.		Corps, &c.
Lt.-Colonel	...	Shaw, G. J.	...	6th Madras Infantry.
Captain	...	Shea, J. S. M.	...	15th Bengal Lancers.
Maj., D.S.O., M.B.		Shearer, J.	...	I. M. S.
Major	...	Sherard, R. W.	...	5th Bombay Cavalry.
Captain	...	Sherwin, F. W. H.	...	Reserve List.
Captain	...	Sherwood, H. J.	...	R. E.
Major	...	Shore, O. B. S. F.	...	18th Bengal Lancers.
Lieutenant	...	Short, P. H.	...	1st Gloucestershire Regt.
Captain	...	Showers, H. L.	...	Dy. Commissioner.
Esquire	...	Shubrick, R. L.	...	Supdt., Central Jail.
Captain	...	Sillery, J. J. D.	...	25th Bombay Infantry.
Major	...	Simpson, C. N.	...	R. A.
Lt.-Colonel	...	Simpson, C. R.	...	Lincolnshire Regt.
Br.-Genl., C.B.	...	Simpson, G.	...	D. A. General.
Major	...	Simpson, G. G.	...	R. A.
Lieutenant	...	Simpson, W. H.	...	33rd Madras Infantry.
Lt.-Colonel	...	Sinclair, H. M.	...	R. E.
Major, M.L.	...	Skinner, B. M.	...	R. A. M. Corps.
Captain	...	Skinner, F. St. D.	...	2nd Royal Sussex Regt.
Lieutenant	...	Smith, A. Le F.	...	2nd Bengal Infantry.
Captain	...	Smith, F. A.	...	2nd Bengal Infantry.

## ORDINARY MEMBERS—continued.

Rank.	Name.	Corps, &c.
Esquire ...	Smith, H. W. ...	Supdt. of Telegraphs.
Captain, V. C., C.I.E.	Smith, J. Manners ...	Political Agent.
Lieutenant ...	Smith, R. O. ...	17th Bengal Cavalry.
Lieutenant ...	Smith-Rewse, G. B. W.	R. Warwickshire Regt.
Captain ...	Smyth, V. S. ...	R. Warwickshire Regt.
Captain ...	Soady, G. J. F. M. ...	19th Punjab Infantry.
Lieutenant ...	Somerville, S. W. ...	Middlesex Regiment.
Major ...	Southey, R. ...	30th Bombay Infantry.
Major ...	Spankie, G. T. ...	Comdg. Oudh L. Horse.
Major ...	Spencer, D. B. ...	I. M. S.
The Ven'ble Arch-deacon.	Spens, A. N. W. ...	Eccles. Estabt.
Colonel ...	Spratt-Bowring, F. T. N.	R. E.
Captain ...	Stainforth, L. C. H. ...	38th Dogras.
Major, D. S. O. ...	Stanton, H. E. ...	R. A., Asst. Mily. Secy., Bombay.
Lt.-Colonel ...	Stawell, G. D. ...	A. A. General.
Captain ...	Stayner, F. S. ...	1st Gloucestershire Regt.
Maj.-Genl., K.C.I.E. C.B.	Stedman, Sir E. ...	S. C.
Major ....	Steele, L. L. ...	Wiltshire Regt.
Major ...	Stevens, C. ...	Retired.
Lt.-Colonel ...	Stevens, O. F. ...	15th Madras Infantry.
Colonel ...	Stevens, G. M. ...	R. A.

## ORDINARY MEMBERS—continued.

Rank.		Name.		Corps, &c.
Captain	...	Stevens, M.	...	13th Bengal Infantry.
Captain	...	Stevens, N. M. C.	...	21st Madras Pioneers.
Captain	...	Stevens, S. R.	...	33rd Madras Infantry.
Lieutenant	...	Stewart, H.	...	4th Infantry, H. C.
Captain	...	Stewart, J. A.	...	7th Bengal Infantry.
Captain	...	Stirling, W. G. H.	...	26th Madras Infantry.
Colonel	...	Stokes, F. S. F.	...	A. A. General.
Br.-General, c. b.		Stopford, A. B.	...	R. A.
Captain	...	Stotherd, E. A. W.	...	4th Lancers, H. C.
Captain	...	Strachey, B.	...	S. Corps.
Major	...	Strachey, J.	...	11th Bengal Infantry.
Major	...	Strachey, R. J.	...	D. A. Q. M. Genl.
Major	...	Strange, R. G.	...	R. A.
Lieutenant	...	Strick, J. A.		1st Shropshire L. I.
Major	...	Strickland, P. C. H.	...	I. M. S.
Captain	...	Strickland, W. A. W.	...	Deputy Commisiner.
Major	...	Stuart, R. C. O.	...	R. A.
Major	...	Stubbs, A. K.	...	1st Worcester Regt.
Major	...	Sturges, W. E.	...	Northumberland Fus.
Major	...	Sutton, H. G.	...	27th Madras Infantry.
Major	...	Swaine, A. T.	...	Royal Irish Rifles.

## ORDINARY MEMBERS—continued.

Rank.		Name.		Corps, &c.
Captain	...	Swales, W. H.	...	Punjab Light Horse.
Captain	...	Swanston, C. O.	...	18th Bengal Lancers.
Captain	...	Swayne, E. J. E.	...	16th Bengal Infantry.
Lieutenant	...	Sweet, E. H.	...	1-2nd Gurkha Rifles.
Major	...	Sykes, P. M.	...	2nd Dragoon Guards.
Major, D.S.O., M.B.		Sykes, W. A.	...	1. M. S.
Lieutenant	...	Sykes, W. E.	...	2nd Y. and L. Regt.
Captain	...	Symonds, G. D.	...	R. A.
Lieutenant	...	Tahourdin, S. M.	...	7th Bengal Cavalry.
Lieutenant	...	Tandy, E. A.	...	R. E.
Captain	...	Tarte, B. R. K.	...	East Kent Regt.
Major, D.S.O.	...	Taylor, H. N.	...	30th Madras Infantry.
Surgeon-General, C.B., M.D.		Taylor, W.	...	P. M. O. in India.
Lt.-Colonel, C.I.E.		Temple, R. C.	...	I. S. Corps.
Lieutenant	...	Temple, W. A. M.	...	1st Gloucestershire Regt.
Captain	...	Templer, C. B.	...	19th Bengal Lancers.
Major	...	Templer, H.	...	5th Punjab Cavalry.
Lt. Col., D.S.O.	...	Teversham, R. K.	...	3rd Madras Infantry.
Captain	...	Thackeray, H. J.	...	2nd Highland L. I.
Lt.-Colonel	...	Thatcher, J. F. C.	...	22nd Bombay Infantry.
Captain	...	Thompson, H. A.	...	2nd Connaught Rangers.

## ORDINARY MEMBERS—continued.

Rank.	Name.	Corps, &c.
Vety.-Colonel ...	Thomson, H. ...	P. Vety. Officer in India.
Major ...	Thomson, W. D. ...	Asst. Judge Advoc. Genl.
The Hon'ble ...	Thorburn, S. S. ...	C. Service.
Captain ...	Thring, R. H. D. ...	D. A. A. General.
Captain ...	Thullier, H. F. ...	R. E.
Colonel ...	Thurburn, J. W. ...	R. E.
Major ...	Thwaytes, E. C. ..	24th Madras Infantry.
Major, D.S.O. ...	Tighe, M. J. ...	27th Bombay Infantry.
Lieutenant ...	Tillard, F. B. ...	R. E.
Captain ...	Tod, J. K. ...	Staff Captain, I. B.
Lt.-Colonel ...	Tonnochey, V. C. ...	3rd Sikhs.
The Hon'ble, K.C.S.I.	Trevor, Sir A. C. ...	Member of the Viceregal Council.
Captain ...	Trevor, H. ...	15th Sikhs.
Captain ...	Tribe, C. W. ...	38th Bengal Infantry.
Lieutenant ...	Tringham, A. M. ...	Royal W. Surrey Regt.
Colonel ...	Trotter, P. D. ...	Retired.
Maj.-General, C.I.E	Tucker, L. H. E. ...	B. S. Corps.
Captain ...	Tulloh, G. S. ...	1st Gloucestershire Regt.
Colonel ...	Turnbull, C. F. A. ...	Duke of Cornwall's L. I.
Lieutenant ...	Turner, A. E. ...	R. E.
Colonel, C.B. ...	Turner, A. H. ...	I. S. Corps.

## ORDINARY MEMBERS—continued.

Rank.	Name.	Corps, &c.
Major ...	Turner, J. G. ...	2nd Bengal Lancers.
Captain ...	Turner, M. N. ...	Duke of Cornwall's L. I.
Major-General ...	Turner, S. O. ...	R. E., D.-G., M. Works.
Captain ...	Tweddell, F. ...	28th Punjab Infantry.
Captain ...	Tweddell, H. ...	4th Bengal Infantry.
Captain ...	Twisleton-Wykeham-Fiennes, H. E.	9th Lancers.
Lieutenant ...	Tylden-Patterson, E. O.	R. E.
Major-General ...	Tyler, T. B. ...	R. A., I.-G., Arty. in India.
Lieutenant ...	Tyrell, G. E. ...	R. A.
Major ...	Unwin, G. B. ...	1st Punjab Cavalry.
Lt.-Colonel ...	Upcott, F. R. ...	2nd Punjab V. Rifles.
Captain ...	Vallancey, H. d'E. ...	A. and S. Highlanders.
Captain ...	Van-Straubensee, C.H.C.	2nd Suffolk Regiment.
Major ...	Vaughan, H. B. ...	7th Bengal Infantry.
Captain ...	Venables, O. J. ...	1st Gloucestershire Regt.
Br.-General ...	Ventris, F. ...	Comdg. Bombay Dist.
Captain ...	Vickers, H. ...	D. A. A. G. for Musky.
Lt.-Colonel ...	Vivian, F. G. ...	38th Bengal Infantry.
Lieutenant ...	Wace, E. G. ...	R. E.
Maj.-General, C.B.	Wace, R. ...	R. A., D. G. of Ordnance in India.
Major ...	Waldron, H. F. K. ...	16th Bengal Cavalry.

## ORDINARY MEMBERS—continued.

Rank.	Name.	Corps, &c.
Captain ...	Walker, A. L. ...	R. A.
Captain ...	Walker, H. B. ..	D. A. Q. M. G., I. Branch.
Lieutenant ...	Walker, J. D. G. ...	Royal Highlanders.
Colonel ...	Walker, J. N. ...	S. C.
Captain ...	Walker, W. G. ...	1-4th Gurkha Rifles.
Captain ...	Walker, W. R. ...	15th Madras Infantry.
Major ...	Wallace, A. ...	27th Punjab Infantry.
Major ...	Wallace, W. R. P. ...	1st Gloucestershire Regt.
Major ...	Waller, E. A. ...	R. E.
Esquire ...	Wallis, B. G. ...	O. E., Supdg. Engr.
Captain ...	Walters, H. F. .	24th Bombay Infantry.
Captain ...	Warden, A. W. ...	3rd Lancers, H. C.
Captain ...	Warwick, C. S. ...	2nd Devonshire Regt.
Maj.-General, C.B.	Waterfield, H. G. ...	S. C.
Major ...	Watkins, L. G. ...	R. A., Ordnance Dept.
Lt.-Colonel ...	Watkis, H. B. B. ...	D. A. A. General.
Captain ...	Watling, F. W. ...	R. E.
Lt.-Colonel ...	Watson, A. J. ...	Suffolk Regiment.
Captain ...	Watson, C. G. ...	R. A.
Captain ...	Watson, E. H. ...	33rd Punjab Infantry.
Captain ...	Watson, H. D. ...	1-2nd Gurkha Rifles.

## ORDINARY MEMBERS—continued.

Rank.	Name.	Corps, &c.
Captain ...	Watson, L. A. ...	31st Punjab Infantry.
Colonel ...	Watts, J. B. ...	Retired.
Captain ...	Webster, T. ...	12th Bengal Infantry.
Captain ...	Wellby, M. S. ...	18th Hussars.
Major, D.S.O. ...	Westlake, A. P. ...	1st Madras Lancers.
Maj.-Genl., K.C.B., D.S.O.	Westmacott, Sir R. ...	I. S. Corps.
Lt.-Colonel ...	Westmorland, C. H. ...	6th Bengal Infantry.
Major, V.D. ...	Weston, E. ...	2nd Punjab Vol. Rifles.
Lt.-Colonel ...	Wheatley, H. S. ...	2-3rd Gurkha Rifles.
Major ...	Whistler, A. E. ...	16th Bengal Infantry.
Lt. Colonel ...	White, F. P. L. ...	5th Punjab Infantry.
Lt.-Genl., V.O., G.C.B., G.O.S.I., G.O.I.E.	White, Sir G. S. ...	Lt.-Genl., South Africa.
Lt.-Colonel ...	White, J. G. ...	Middlesex Regiment.
Captain ...	White, W. E. ...	1st Bengal Infantry.
Captain ...	Whitehead, J. H. ...	33rd Madras Infantry.
Major ...	Whittall, F. V. ...	1st Infantry, H. C.
Major ...	Whyte, C. W. F. ...	17th Bombay Infantry.
Major ...	Wickham, W. J. R. ...	A. C. General.
Lieutenant ...	Wigram, O. ...	18th Bengal Lancers.
Lt.-Colonel ...	Wilford, E. P. ...	1st Gloucestershire Regt.
Lt.-Colonel ...	Wilkieson, C. B. ...	Late R. E.



## ORDINARY MEMBERS—continued.

Rank.		Name.		Corps, &c.
Captain	...	Willcock, S.	...	1st Gloucestershire Regt.
Lt.-Col.,	C.M.G.,	Wilcocks, J.	...	W. African Front. Force.
D.S.O.				
Captain	...	Williams, C. S.	...	43rd Gurkha Rifles.
Captain	...	Williams, F. T.	...	D. A. A. General.
Captain	...	Willoughby, M. E.	...	2nd Bengal Lancers.
Major	...	Willshire, E. M.	...	1st Royal Highlanders.
Captain	...	Wilson, C. E.	...	2nd Durham L. I.
Colonel, C.B.	...	Wilson, E. H.	...	S. O.
Colonel	...	Wilson, F. A.	...	S. O.
Lt.-Colonel	...	Wilson, W. B.	...	D. J. Adv. Genl.
Captain	...	Wimberley, C. I.	...	8th Bengal Cavalry.
Captain	...	Wingate, A. W. S.	...	14th Bengal Lancers.
Lt.-Colonel	...	Wingate, G.	...	Commissary-General.
Major	...	Wintour, F.	...	Royal West Kent Regt.
Major-General,		Wodehouse, J. H.	...	Comdg. Secunderabad
C.B., C.M.G.				District.
Lt.-Colonel	...	Wogan-Browne, F. W. N.	...	3rd Hussars.
Lt.-General, K.C.B.		Wolseley, Sir G. B.	...	Commanding the Forces,
				Madras.
Lt.-Colonel	...	Wood, E. J. F.	...	10th Bengal Lancers.
Captain	...	Wood, T. B.	...	R. A.
The Hon'ble,		Woodburn, Sir J.	...	Lt.-Govr., Bengal.
K.C.S.I.,				
Captain	...	Woodyatt, N. G.	...	D. A. A. G., Munsky.

## ORDINARY MEMBERS—concluded.

Rank.	Name.	Corps, &c.
Major ...	Wrench, A. J. O. ...	Late 1st B. Welsh Fns.
Lt.-Col., D.S.O., M.B.	Wright, F. W. ...	I. M. S.
Major ...	Wright, G. ...	R. A.
Major ...	Wright, H. ...	Gordon Highlanders.
Lt.-Colonel, v.D.	Wright, W. B. ...	Midland Rail. V. Rifles.
Maj.-Genl., C.S.I.	Wylie, H. ...	Political Resident.
Major ...	Wylly, H. O. ...	2nd Derbyshire Regt.
Captain ...	Wyndham, G. P. ...	16th Lancers.
Lieutenant ...	Wyness, J. P. ...	Calcutta Port Defence Corps.
Lt.-Colonel ...	Yate, W. G. ...	5th Bengal Cavalry.
Lieutenant ...	Young, D. O. ...	1-4th Gurkha Rifles.
Lt.-Colonel ...	Young, E. A. ...	4th Bengal Cavalry.
Captain ...	Young, F. deB. ...	6th Bengal Cavalry.
Br.-General, C.B.	Young, G. F. ...	D. A. General.
Lt.-Colonel ...	Young, H. H. ...	S. O.
Major ...	Young, W. B. ...	9th Madras Infantry.
Captain, C.I.E. ...	Youngusband, E. F. ...	Political Agent.

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# The Journal

OF THE

## United Service Institution of India.

VOL. XXIX.

JANUARY 1900.

No. 138.

### "THINGS CHINESE"

WITH A SHORT ACCOUNT OF A JOURNEY THROUGH  
THE HEART OF CHINA.

LECTURE BY CAPTAIN A. W. S. WINGATE, 14th BENGAL LANCERS.

*Tuesday, 3rd October 1899.*

MAJOR-GENERAL SIR EDWIN COLLEN, K.C.I.E., C.B., IN THE CHAIR.

"I have gathered a posie of other men's flowers,"

"And nothing but the thread that binds them is mine own."

Before proceeding to my subject, it would, perhaps, be as well to explain why a lecture on "Things Chinese" should interest the Anglo-Indian public.

Reasons for "Lecture."

*Firstly*, then—The frontiers of the British-Indian and Chinese Empires are now contiguous for some 3,000 odd miles, of which not less than 800 miles form the boundary between Burma and Yün-nan, one of the 18 Provinces of China Proper.

Frontiers of India and China contiguous.

*Secondly*.—Five great Western Nations (besides Italy and Belgium) are daily engaged in a ceaseless endeavour to solve the riddle, "what shall be done with China?", and millions of people are anxiously watching each move on the Celestial chess-board.

"What shall be done with China?"

*Thirdly*.—In the event of serious complications of a belligerent character in that vast Empire, it is more than probable that the Government of India would be called upon to furnish a portion of the army of occupation or expedition which the British Government might find it necessary to despatch.

Indian troops required in emergency.

To tell the truth, the whole truth, and nothing but the truth, about the Chinese would be a task beyond my powers. No single person, whatever the extent of his or her knowledge could, by any possibility, know the whole truth about this most incomprehensible people, much less could it be told in a short paper.

What I shall say, therefore, is merely a kind of preface—an introduction in fact—to the very bulky literature on the subject, a list of the more important of which will be found at the end of this paper.\*

The journey which I undertook was essentially of a pacific nature. It lay through a fertile and beautiful country, for the most part densely populated, and there was so little danger to face that it required, perhaps, less courage and endurance than would have a similar undertaking across the Continent of Europe one hundred years ago! My greatest difficulty and almost daily problem was, not so much where to seek for food and water, as how to obtain it without attracting the unwelcome attentions of two or three thousand Celestials! It is true that I did take with me an automatic Mauser pistol and a magazine rifle, but it was more to show the Chinese what a long way behind the times bows and arrows are, than with any idea of fighting.

## PART I.

I shall commence with a few dry statistics, because they are necessary for a just appreciation of what I have to say.

The area of the 18 Provinces of China Proper† is only about 200,000 square miles less than the whole of the British-Indian Empire, including Burma, Baluchistan, Kashmir, and all outlying dependencies. The total area of the Chinese Empire, including Manchuria, Mongolia, Thibet, and Kashgaria, is  $4\frac{1}{2}$  millions of square miles; that is to say,  $2\frac{1}{2}$  times as big as the Indian Empire, and one-twelfth the total land-surface of the globe! It may be of interest to note that the difference between the area of China Proper and that of the whole Empire, *vis.*, three million square miles, will possibly, nay it might even be said probably, in the not far distant future, come under the sway of the Great White Czar.

The total population of the Indian Empire is roughly 290 millions; that of the Chinese Empire 350 millions, of whom the great bulk belong to the 18 Provinces of China Proper.

In addition to the above statistics, I must ask you to kindly carry the following few items in your minds.

\* The Chinese are *Chinese*, not Occidentals, not Indians; European International law is inapplicable to them.

\* See list at end of this paper.

† China Proper lies to the south of, or inside, the Great Wall.

**The Chinese Empire is rather larger than Europe. Its climate approaches nearest in extremes to that of North America.\***

Climate.

**Its fruits, flowers, crops, and animals vary as they do in Europe ; while the people, their language, manners and customs vary as they do in**

Flora and Fauna.

**India, but in a much less degree. There is no caste-prejudice as understood in India.**

**Peking is on the same parallel as Constantinople ; Chungking as Cairo ; Shanghai as Algiers ; and Canton as Calcutta.**

Latitudes of places compared.

**Ssu-ch'uan, the most inland province of China, the goal of all the French and British railway projects from the south-west, has an increasing population of over 50 millions.**

Ch'eng-tu in Ssu-ch'uan.

**Ch'eng-tu, its capital, lies in a plain only about the size of Lancashire, but it can boast of two million more people living in it than the English county.**

**The Russian nation, with one-third of the population, covers twice as much territory as the Chinese.**

Population of Russia.

**In China there is no Poor-Law, and there are no Sundays. As**

Chinese customs and manners.

**Mrs. Little puts it in her interesting book "Intimate China" : "It is considered very unwomanly *not* to wear trousers, and very indelicate for a man to wear a short coat." Hence we have the curious fact that the dress usually worn by the people of Western Nations is, in China, considered extremely improper.**

**The Chinese begin dinner with dessert and end with soup or a bowl of rice. They are good cooks ; and they have a great love for children.**

**In fact, of all Asiatic peoples with whom I have come in contact,**

The Chinese like Westerners in many things.

**the Chinese have most in common with Western Nations. In spite of the truth that their way of doing most things is what we call "topsy-turvy," many of their manners and customs are similar to ours.**

**Unlike us, they place their guest on the left-hand side of the host ; while we put ours on the right.**

**We take off our hats in the house ; the Chinese keep theirs on.**

**We put our tea-cups in the saucers ; they put the saucer in the cup !**

**We write from left to right ; the Chinese commence in the right-hand top corner and write downwards.**

**We rely greatly on milk as an article of food ; in China there is practically no milk.**

**We prefer to drink cold water ; while the Chinese never touch cold, if they can obtain hot water.**

**The roof of a Chinese house is built before the house which it is intended to cover.**

**The Chinese are, without doubt, a proud and conceited people ; but, notwithstanding this, it is their custom to depreciate themselves and their belongings, and to give the praise to others.**

---

\* Manchuria and Northern China is a white man's country.

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**Flora and Fauna.**

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**Latitudes of places compared.**

Cairo ; Shanghai as Algiers ; and Canton as Calcutta.

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---

\* Manchuria and Northern China is a white man's country.

Their idea of life is to avoid "too muchee bobbery,"\* and to get money.

On the other hand, many of their social customs, and their ways of conducting business, are more or less like our own. They thoroughly appreciate a joke, and will roar with laughter, as many a foreigner has found to his discomfiture.

They give dinner parties and other entertainments; drink one another's healths with no "heel-taps," and smoke tobacco much as Occidentals do. Economy is their guiding principle, and they reckon their money in 32 divisions of a penny.

China's military power may be summed up in the one word "*Nil*."

I arrived in Peking in September 1897, and through the kindness of Sir Claude and Lady MacDonald found quarters in the British Legation.

Arrival in Peking.

I should like, were there time, to say a great deal about the "Centre of the Universe," although so much has been written that it would be difficult to find anything new.

Sir Harry Parkes described Peking as "Dirt, Dust, and Disdain." I am inclined to agree with Mrs. Archibald Little that this description to be accurate, requires the addition of a few more big Ds.

The British Legation is, however, a delightful spot; and were it not for the dust and filth, and the want of roads as we understand them, Peking

The British Legation.

would be endurable.

There are plenty of amusements in Peking, including spring and autumn races, paper-chasing and skating.

Amusements.

The modes of conveyance in Peking are:—cart, mule, pony, donkey, mule-litter, sedan-chair, Shank's mare, and quite recently "rickshaws."

The carts are excellent, and were the roads good, one would not mind the absence of springs. I have here a real working model of an ordinary Peking cab. Such a vehicle costs from £8 to £12 according to finish. A "brougham" on the same pattern would be about £20; while a really swagger "mandarin's" carriage would cost more still.†

Mules are preferred for harness work. Some are very fine. The price varies from £6 to £70 and £80 each.

All the ponies come from Mongolia. At present they cost from £5 to £10. When the Russians begin to mount their Tartar, Mongolian, and

Mongolian ponies.

Manchurian Cossacks, the price may be expected to increase rapidly.

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Leaving town.

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Recreation-ground best in Asia.

To military people Shanghai Arsenal is worth a visit. There are nine arsenals in China, but only those at Tientsin, Hankow and Fukien can in any way compare with the one at Shanghai. They manufacture

Their idea of life is to avoid "too muchee bobbery,"\* and to get money.

On the other hand, many of their social customs, and their ways of conducting business, are more or less like our own. They thoroughly appreciate a joke, and will roar with laughter, as many a foreigner has found to his discomfiture.

They give dinner parties and other entertainments; drink one another's healths with no "heel-taps," and smoke tobacco much as Occidentals do. Economy is their guiding principle, and they reckon their money in 32 divisions of a penny.

China's military power may be summed up in the one word "*Nil*."

I arrived in Peking in September 1897, and through the kindness of Sir Claude and Lady MacDonald found quarters in the British Legation.

Arrival in Peking.

I should like, were there time, to say a great deal about the "Centre of the Universe," although so much has been written that it would be difficult to find anything new.

Sir Harry Parkes described Peking as "Dirt, Dust, and Disdain." I am inclined to agree with Mrs. Archibald Little that this description to be accurate, requires the addition of a few more big Ds.

The British Legation is, however, a delightful spot; and were it not for the dust and filth, and the want of roads as we understand them, Peking would be endurable.

The British Legation.

There are plenty of amusements in Peking, including spring and autumn races, paper-chasing and skating.

Amusements.

The modes of conveyance in Peking are:—cart, mule, pony, donkey, mule-litter, sedan-chair, Shank's mare, and quite recently "rickshaws."

The carts are excellent, and were the roads good, one would not mind the absence of springs. I have here a real working model of an ordinary Peking cab. Such a vehicle costs from £8 to £12 according to finish. A "brougham" on the same pattern would be about £20; while a really swagger "mandarin's" carriage would cost more still.†

Chinese carts.

Mules are preferred for harness work. Some are very fine. The price varies from £6 to £70 and £80 each.

All the ponies come from Mongolia. At present they cost from

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here anything from a pin to a first-class gunboat or a 35-ton gun. The whole is solely under the direction and management of the Chinese; the foreigners in charge merely draw the plans, test powders and guns, and arrange the purchase of machinery. I should mention

The term "foreigner."

that the term "foreigner" in China includes all who are not Chinese.

Hundreds of thousands of pounds sterling, bled from the Chinese people, are annually frittered away by means of arsenals, mints, mills and such-like, by a set of dishonest officials.

From Shanghai I proceeded by the Grand Canal to Kiang-yin, "the key of the Yangtze river" as it is called.

The Grand Canal.

Su-chou, on the Grand Canal, which I passed *en route*, is called the Venice of China; and a very beautiful spot it is. It shares with Hang-chou the

Su-chou and Hang-chou.

honor of being the Chinese terrestrial paradise. They say—

"Shang yu t'ien t'ang:

Hsia yu Su Hang."

Above is the Hall of God:

Below is Su-chou and Hang-chou.

Kiang-yin is a most suitable spot for a large cantonment; and certainly no vessel could get up or down the river were the guns in the forts properly manned.

Much might be said about the Treaty ports on the Yangtze and of China's former capital, Nanking. This place was the seat of Government till

Treaty ports.

1411 A.D. Hang-chou has also been the Capital, and other cities besides.

The river steamers on the Yangtze are like those on the rivers of North America, and are well fitted and comfortable.

Signs are not wanting at the towns passed on a trip up the Yangtze of the slow but sure advance of West-

Signs of the advance of Westernism.

ern civilisation; tall chimney stacks, factories, landing-piers, esplanades, and

steam-launches.

At Chin-chiang can be seen the spot where the British fleet anchored in 1842. The changeable course of the Yangtze has now left it high and dry covered with crops and villages!

There is plenty of small game shooting in the Yangtze valley and as good pheasant-shooting can be obtained

Small game.

between Shanghai and Nanking as is to be had anywhere out of England. In 1895, 40,000 brace of pheasants were sold in the Shanghai markets. There are also wild boar in plenty, but they are only shot.

Large game in China is scarce. There are Manchurian tigers, good skins of which, I believe, fetch fifty guineas

Large game.

in England. There are small tigers in the southern provinces, especially around Amoy. There are red deer

in the north, and a rare kind of bear and wild-ox (of which only two specimens have been shot) near Sung'p'an in North-Western Ssu-ch'uan. But on the whole I am inclined to think that for large-game shooting (in Asia) Burma, Siam, and the central and southern parts of India, are much to be preferred to China. Manchuria, Kan-su, North and North-Western Ssu-ch'uan are the best provinces in China Proper for large game shooting, and for rare species of pheasants.

At Hankow I spent many days waiting for China's greatest Viceroy  
 Hankow. Chang-chih-tung to make up his mind whether he would see me or not. When

he heard that I wanted to go through Hu-nan, he made every effort to prevent my carrying out my intention! He said that, in consequence of the *coup d'état*, the whole of China was in a most disturbed state.

China's greatest Viceroy, However, after ten days "talking," His  
 Chang-chih-tung. Excellency not only honoured me with a two hours' interview, but gave me leave to proceed on my journey and lent me one of his gunboats to tow my Chinese boat to Yo-chou at the entrance of the Tung-ting lake.

I had an excellent time at Hankow, visiting the arsenal, iron and steel foundries, small-arms factory, cotton mills, Russian tea factories (of which there are several), and in "reviewing" Chang-chih-tung's "foreign-drilled" army. All this sounds rather splendid, and quite European-like, and so it would be, were it under the management of foreigners. As it is, the whole of the above, with the exception of the Russian tea factories, are merely "dodges" for carrying on the great games of "humbug" and "squeezing" so dear to the Chinese heart.

Chang-chih-tung is one of the greatest satraps in China and one of the most learned scholars of his generation. Old age is fast coming upon him but when the time comes for him to retire from office, he will carry with him the honourable distinction, unique among Chinese officials, of leaving office a poorer man than when he entered it.

"Pride goeth before destruction and a haughty spirit before a fall!"

The Chinese a haughty people. The Chinese ought to know the full meaning of the above, for "the Book of Proverbs is not one whit better than the maxims of Confucius," but they are so terribly ignorant of the might and wealth of Western Nations that, except just in the Treaty Ports and in Peking, they still look upon foreigners as "wandering Jews" allowed by the grace of the Emperor to roam about the country.

Two things struck me as peculiar to the city which is destined to be the future metropolis of the Yangtze Valley, a part of China, which is, I believe, considered to be what

The British in Hankow. might be called "under the eye" of the British people. The one was that, in sauntering about the streets, two out of every three foreigners whom I passed was not a subject of the British Empire; the other thing that I noticed was that, in a city of



a million inhabitants, where there were daily rumours of riots, the only outward sign of the might and majesty of the greatest Sea-Power that the world

The British fleet on the Yangtze.

Her Majesty's ship "Esk." has ever seen, was Her Majesty's ship "Esk," a tiny wasp of a river gunboat, which, under the most favourable conditions, can go six knots an hour; and which, in order to bring her one small gun to bear, is obliged to turn round first, an awkward thing in a country where the enemy do not often get in front! I saw a statement in the newspapers recently that the British Government

Over 2,000 miles of navigable waterway.

had, in order to protect British interests in China, put a fleet of gunboats on the Yangtze River. The "fleet," so called at present, consists of two flat-bottomed river gunboats dispersed over a length of 1,500 miles of the Yangtze, besides some hundreds of miles of lakes and small rivers, all of which are more or less navigable for boats drawing 3 feet of water and under.

Hankow is a point of the greatest strategic importance. It will become the meeting point of three, and perhaps four, great lines of railway, *vis.*, those from Peking, Canton, Shanghai, and Ch'eng-tu. It is the Allahabad of China; but, owing to its geographical position, it has many advantages denied to the Indian city. It is 600 miles into the heart of China, and yet a whole fleet of the Russian volunteer steamers has anchored off the "Esplanade" during summer. Ships drawing 20 feet of water can reach Hankow during six months of the year. It is only a little more than one-third of the total navigable distance of the Yangtze from the sea; and it is at, or close to, the confluence of two other great waterways—one northwards and the other southwards. The river is a mile wide. 370 miles north-west of Hankow is Tung-kuan, a most important place, where the great highways from Central Asia, Western China, and Thibet to the capital, meet. If Kiang-yin is the key to the Yangtze River on the South, Tung-kuan is the "key of the Yangtze Valley" on the North.

Future strategical importance of Hankow.

Try and picture what this Yangtze River really is. It is as though, taking Calcutta to represent Shanghai, we were able to sail in big ocean-going steamers to Allahabad; and from there to continue in fair-sized river steamers (like those on the Upper Irrawaddy) to Aligarh. Thence to embark in large junks or house-boats as far as Jullundur, and then proceed in steam launches to Rawal Pindi.

The greatest waterway in Asia.

That portion of the Yangtze between I-chang and Chung-king, spoken of as the "gorges" (about 250 miles in length) contains the "rapids," and might be compared to the distance between Aligarh and Umballa.

The Yangtze "gorges."

Could the difficulties attending the navigation of the Yangtze 1,500 miles inland by boat. gorges by steamers be overcome, the voyage could be made the whole way by steamer, from Shanghai to Ping-shan—1,500 miles, or taking India,

gorges by steamers be overcome, the voyage could be made the whole way by steamer, from Shanghai to Ping-shan—1,500 miles, or taking India,

from Calcutta to Rawal Pindi and beyond. Were Pindi on the Yangtze, even there we should only be half-way from mouth to source of this mighty waterway.

Only one steam launch exists on the Upper Yangtze, but there is nothing to prevent any number plying if they could once be got through the Rapids.

Having got a Sedan-chair (without which no foreigner in strange clothes could journey through Hu-nan and make a certainty of reaching the other side in a whole condition) a cook and a t'ing-chai\* (the

The Chinese chaprassi. equivalent of the Indian red-coated chaprassi), also necessary to one's dignity among the Celestials, we set sail from Hankow on the 8th November last in a very comfortable house-boat, and in tow of the Viceroy's gunboat already mentioned.

Before starting I had drawn a bee-line from Shanghai to Mandalay to represent the route which I wished to follow. I stuck to this as closely as possible consistent with the "caution" which I

A bee-line from Shanghai to had received to raise no "international Mandalay. questions" by creating disturbances or getting killed. I am thankful to say that, by the kindness of Her Britannic Majesty's Consul at Hankow, Mr. Warren, and many other kind friends I succeeded in avoiding both contingencies.

My journey, from an exploration point of view, only commenced at Yo-chou. Journey commences at Yo-chou.

From this point Mr. T'ung, a Chinese gentleman, who accompanied me in the position of "hsien-sheng" or "teacher," commenced a road-sketch

The road-sketch. with the help of a two-foot square plane-table, which he stuck to throughout the journey, in rain, snow, fog, mist, cold and heat. Only one single day did he miss, when, owing to a heavy snowfall throughout the day's march, he could not use the table. This sketch, on a scale of  $1\frac{1}{4}$  miles to the inch, produced over 2,000 miles of route covering 75 feet of paper on which every stream, bridge, village, or water-shed passed, was noted down.

I only mention this here to show the stuff that some Chinese are made of, and what excellent surveyors Chinese excellent surveyors. the Survey Department of India might be expected to make of them.

Mr. T'ung had never used a plane-table in his life before ; and all the teaching he had was what I was able to give him at starting.

My other "companion" was a man, named Wang—a taxidermist. He and I, between us, collected over 150 specimens of birds ; some skins, insects, fish, shells, and butterflies. All these have been sent to England and may, I hope, add a few items to the store of knowledge about Central

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\* Literally "one who hears or waits official business."

China. I regret that, until I have received the report of the specialists, who are examining them, I am unable to give any particulars. The collection of these afforded considerable amusement to the Celestials who thought that I wanted the birds and fish to eat, the insects and snakes for medicines, and the shells as charms. The Chinese are very fond of birds, and in Peking every other man carries one about the streets. They train them to fly high in the air and return to their master's cage. They have "gymkhanas" for their birds, and the one that flies highest wins the bets. They don't like people killing small birds.

Chinese love birds.

Journeys in China Proper, like the Chinese themselves, vary so little in the variety of incidents which they afford, unless there be time to go into minute detail, that I do not propose to give *seriatim* the story of my daily "creep" from east to west of the Celestial Empire. So many able men—Baber, Hosie, Bell, Morrison, Bourne, Richtofen, Younghusband, James, Bower, Deasy, and a host of others—have given their experiences to the world, that there really remains but little to tell. What is now required is men who will go to England and endeavour, by various means, to excite among the somewhat stolid British a healthy interest in "Things Chinese."

Travels in China Proper more or less similar.

It may be of interest to the military world in general, and to Anglo-Indians and officers of the Indian Cavalry in particular, to note that the first British officer to make the journey across the northern half of the Chinese Empire to India was Colonel Bell, for many years employed in Simla, and who has left behind him what, in my humble opinion, appears to me one of the ablest military works on China extant. The next was a British Cavalry, and now an Indian Staff Corps, officer, Major Younghusband. He was followed by Colonel Bower of the 17th Bengal Cavalry. Following on Colonel Bower we have Captain Welby and Lieutenant Malcolm, already spoken of, the former also a cavalryman.

Colonel Bell travelled from east to west, Major Younghusband both ways, and Colonel Bower from west to east. All these officers confined their explorations to that portion of the Empire lying north of the Yangtze river. I have omitted Captain Gill as he followed the Yangtze river and ended up in Burma.

Compared to the journeys of the men I have mentioned my little "trip" was child's play. It was only necessary to keep one's temper and adopt a conciliatory attitude towards the sons of Han who will generally listen to reason. This is not such a difficult thing to do as many might suppose, when one is unarmed, and surrounded by several hundreds or thousands of people who have never seen one before, and are not particularly anxious to meet one again! If you get angry, they laugh at you! Mr. Margary, of Her Britannic Majesty's Consular Service in China, was the first British official to travel from Hankow to Bhamo through Hu-nan. He made the journey twenty-six

Keeping one's temper.

Mr. Margary.

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years ago, and has left an interesting record of his travels. He was badly treated in Hu-nan, and, as all are aware, was brutally murdered near the frontiers of Burma, at the instigation of the Chinese officials. I followed in his footsteps for the greater part of my route as far as Yun-nan city, being the first British officer to enter the province of Hu-nan. I mention this to show how little attention has been paid by the British Army to China Proper. There is no reason why this should be so; for, although a Hunanese crowd is not

A Hunanese crowd not so bad. quite the one for a lonely foreigner to encounter on a dark night, it is still less formidable now than it was in Margary's time. Slowly, yet surely, the Chinese are learning that it does not pay to bully foreigners.

Yo-chou was the only place where the crowd actually heaved rocks at my chair; and at Chen-Yuan they tried to frighten me (and succeeded) by shouting "Ta! Ta!" which I had been taught to believe meant "kill, kill!" A short residence in China, however, soon discovers the fact that the Chinese "bite" is not so bad as the "bark"!

I was under "official" protection. That is to say, the authorities had been duly warned to supply me with escorts, and told that, if anything should happen to me, it would be a case of "off with his head." But, where the spirit is willing the flesh is often weak, and it is worth any Government's while to study the way a Chinese District Magistrate manages to keep several millions of people in order with a handful of so-called soldiers or police. I don't believe there are more than 5,000 soldiers between Hankow and Bhamo, and one British Regiment would send them all flying.

At each town of any importance that I came to I visited the Magistrate, who, in returning my call, would, with tears in his eyes, implore me not to endanger my own life and his by entering the gates of his city. The "political" in charge was for ever beseeching me not to walk about the country in the harmless pursuit of "Cocky-olly birds"! He declared that the western part of Hu-nan was infested with rebel "Miao" or aborigines who would kill us all. Most of those I came across ran like hares on catching sight of our party, much to my grief, as I was longing to get a "snap-shot" of the women who, by the way, seemed really pretty, like dusky girls from the west of Ireland.

They were called "Hei" or black, and "Hua" or flowery, according to the colour of their clothes.

There are any number of these tribes; some say 75. Only the women wear their ancient distinctive dress; the men wear clothes like the Chinese. I found the "Hua" or flowery "Miao" wearing "kilts" for all the world like Scotch ones; from which I conclude that the Highland kilt is a very ancient form of undress!

There are 10,000 Mahomedans in Hu-nan, but they compare unfavourably with their Indian co-religionists.

Mahomedans.

I do not wish to convey the idea that travelling in China has no disadvantages. Captain Pottinger, R.A., who was travelling in Western China at the same time that I was, had quite a different reception to that which I experienced.

To the British officer, one of the most significant of Captain Pottinger's experiences is the following. He says:—"Our escort, who at first 'funked,' had now got to know us. They had been regularly paid, and seeing that Hunter and I went for the enemy when necessary, quite irrespective of their numbers, they became really good men and would follow or lead anywhere."..... "From the way the escort served us when once they knew us, I think they would make good soldiers."

The above opinion, on the merits of the Chinese as soldiers, coincides with the one which I had already formed. The men of the above escort were, in all probability, recruited from the same district of North-West Kuei-chou, as the men of my own escort, which I got from Yun-nan City. I can only say that I think they were the jolliest,

most easily managed fellows, I have ever come across. In physique they left little to be desired; and for downright hard marching on poor and scanty fare, and for cheerfulness under trying conditions, they would compare well with the sturdy Gurkha. I well remember one awful march crossing the Yüanchiang, an upper branch of the Red River. We started about 6 on a February morning, and we hoped to reach camp by 5 in the afternoon. We found that this was impossible, as the river had cut an even deeper passage for itself than usual between the mountain ranges which run north and south parallel to each other, up and down the whole of Yün-nan west of the capital, right to the confines of Burma. We started at a level\* of about 6,000 feet, descended to the river-bed 2,000 feet in 4 miles. Up again in 5 miles to 4,850, down again to 3,900 feet; up another 2 miles to 5,050 feet, and down again to camp at 4,800 feet; only 18 miles, all told, but we did not get in till after dark. The place—a few huts—was called Fa-piao;† we thought it a *very* far "piao." Another such march occurred a few days later. Starting equally early in the morning,

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The advocates of such a theory—for theory it is—are constantly quoting the behaviour of the Chinese during the war with Japan. It is not at all certain that the soldiers or their officers ever wanted to fight for the impossible Manchu

Government under whom they served.

Why Chinese soldiers don't fight. Why should they have fought? Without transport or commissariat of any kind, with scarcely any clothes, and no one to lead them! As Mrs. Archibald Little puts it, "often without any guns, and if they had got the guns, they had not got the cartridges that fitted them. The men stolidly appreciated the situation; they made no complaint; but when they could, they ran away, which was about the only thing they could do under the circumstances!" In judging the behaviour of Chinese soldiers during the last war, account should be taken of the fact that Chinese soldiers, unlike the Natives of India in former times, and the frontier tribes of to-day, have been accustomed for centuries to rely on a properly constituted Government for their officers, supplies, arms, and ammunition, and on their leaders for orders. Owing to the decay of the dynasty all these things are now wanting, and yet they were suddenly called upon to meet a modern army of men accustomed to fight and drilled, organised, and equipped on the latest approved principles. Valentine Chirol compares it to "an encounter between such tactics as were employed by Agamemnon of Troy and such as might have been conceived by Moltke."\*

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To return to my journey. To any one who has lots of time at their disposal, and nothing particular to do, I would advise a trip in a house-boat on the Yüan River. The scenery is quite beautiful, and the climate from October to April delightful. Hunan, with its bright sunshine, green fir-clad hills, rippling clear rivers, and beautiful lake, is quite a place in which to spend a happy day. The Yüan River is a fisherman's paradise. The naturalist and geologist will find plenty of occupation, while the artist's brush need never be idle for want of an interesting subject to depict. Narrow river gorges, pretty white and gold temples perched upon the top of high precipitous cliffs, or upon mountain peaks; boats being hauled over roaring rapids by from 10 to 30 trackers, tugging with might and main for all they are worth, amid the gayest shrillest cries from their comrades on the boats. Such is the daily scene on a Hunan river. Never have I seen men work harder than the boatmen on those rivers! They most certainly earned their pay. Imagine what that was when I say that for a fine big house-boat—80 feet long and 8 to 9 feet broad—the price was 90,000 cash (about £9) for 450 miles of hauling against the current and through hundreds of rapids, over some of which the boat was literally dragged along the bed of the river by from 15 to 20 men; while 3 or 4 others, using long bamboo shoulder poles, kept her off the rocks. We averaged 15 miles a day, in spite of all these difficulties and the journey occupied 36 days. So the hire came to five shillings a day (5*d.* per man) which included food for my 5 Chinese followers and hot water *ad lib* for myself.

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Mr. Fleming's murder. came to the spot where the Australian missionary, Mr. Fleming, was murdered a short time before my arrival there.

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Done by the officials. officials in full view of some 500 people of the town of Ch'ung-an. I took a photograph of one of the actual murderers sitting in the cage used by the Chinese Government for the conveyance of criminals about the country. He looked quite happy, smoking his pipe.

Near this same place, at Huang-p'ing, I came across a crowd of

"Miao" rebels. heads on sticks lining the side of the road outside the city gate. I found that there had been a raid upon the town by the "Miao" from the hills, and this was the Chinese method of settling troubles with adjoining hill-tribes. The Chinese Government is still occasionally troubled, as is the Indian Government, by disobedient people who live in the hills.

At a place, called Ch'ing-ch'i, right in the heart of China, I found a

Iron foundry in the heart of China. complete set of Iron Foundry Works, with machinery by the best English makers. The works had cost £330,000 to complete; the undertaking failed but the scoundrel who started it had made his pile.

It is by hair-brained schemes like these that the Chinese people are led to distrust the foreigner, and his methods. There are many such examples throughout the Empire.

From Hu-nan we entered Kuei-chou Province. The two characters Kuei-chou Province. signify " noble region." It has been called the " Switzerland " of China and so, if the Swiss had possession of it, I have no doubt it would be. In Kuei-chou as in Yün-nan and Kan-su rebellions have almost depopulated parts of it, and there are now only six million people in the province.

At Kuei-yang City I met Mr. Consul Litton, and we had a day's pheasant-shooting together in country rather like Scotch moors. He was the first white man I had seen for nearly two months.

Kuei-chou and Yün-nan grow opium in large quantities. Nearly all the mules and coolies one meets on the roads are carrying opium to Hu-nan and the south. 85 per cent. of the population of these two provinces smoke opium, although probably not more than 2 per cent. of the total population of the Empire smoke the drug.\* Nearly every-one, however, uses tobacco.

Yün-nan and Kuei-chou seem to have collected some of the worse characters in China.

I reached Kuei-yang on the 8th January and Yün-nan City on the 8th February, 1899.

The weather in Kuei-chou was abominable: fogs, rain, snow, and sleet. At Chen-yuan we left our boat and, placing our belongings on mules, took to the great thoroughfare which leads from Peking to Bhamo.

A "road" in China is generally a bridlepath, paved or unpaved, and sometimes two cart ruts. There is scarcely a rut south of the Yangtze River.

The northern half of Kuei-chou is a plateau averaging 6,000 feet above sea-level, and a delightful country to live in, although Yün-nan is perhaps better on the whole.

These two provinces are, like Kashmir, beautiful countries where "only man is vile." It is a mistake to judge the Chinese by the specimens met with in these provinces. The best of the inhabitants hereabouts are the "Miao" or aborigines.

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They were one and all glad to see me, and behaved in the most hospitable manner possible.

From Yün-nan City onwards to Ma-li-pa (Tawnio), a little over 800 miles, I traversed a more or less unexplored country.

It was a daily trudge up and down mountain ranges and across rivers running north and south which had cut deep down into the surface of the earth. The "trudge" from Yün-nan City to Tawnio. It was during this month-and-a-half's march that we had a rather hard time, chiefly owing to poor and scanty food, long marches (averaging 18 miles a day including halts), and "malaria" in the valley bottoms.\* I had a nasty "go" of fever for ten days, and most of our party were pretty knocked up. The valleys of the Ching-tung, Mekong, and Salween rivers are certainly not over-healthy. East of the Mekong, near Wei-yüan, we came across the first Shans and "Pongyis," or Burmese priests met with on our journey.

It was my intention to have continued straight along the bee-line to Mandalay, but on reaching Mông-kou we found that some savages called "K'e-wa" objected to our traversing their country, so we were obliged, not being an expeditionary force, to turn away northwards and after some more long trudges pulled up at Ma-li-pa or Tawnio (as our maps have it) where we were delighted to meet the Northern Party of the Commission then delimitating the new frontier dividing the British Indian and Chinese Empires in this quarter of the globe. We had again been many weeks without meeting any white faces, and it was just seven months since I had met one of my own cloth, and we were exceedingly glad to be once again on British soil.

After being treated like princes by Mr. Scott and his merry companions (the Chinese Commissioner, General Liu, being one of the merriest), we started off once more, still up and down mountain ranges, and brought up at Bhamo on the 20th April. We stayed here two days enjoying the good things set before us by Captain Bernard, Commandant of the Military Police. Here I saw the new Kachin Company recently added to our army in that quarter. They looked well and were wonderfully smart, considering the short time they had been at work.

I should mention that east of the Mekong my muleteers went on strike twice. Much talking, some money, and the long arm of the Chinese Government, eventually induced them to accompany me onward.

\* The distance measured on a map of China between I-men and Ching-tung is about 75 miles "as the crow flies." In order to accomplish the journey by the most direct route we marched 200 miles†; this will afford some idea of the nature of the country traversed—a series of mountain ranges and deep valleys running north and south, parallel to each other. The average height of the hills is between 7,000 and 8,000 feet above sea-level, while the river-beds average only 2,300 feet, and one (the Red river) is as low as 1,700 feet. (See sections at end.)

† 10 days' march for 9 hours a day excluding halts.

The cause was the extreme aversion which the Chinese have to Chinese don't like going west going west of the Mekong, south of the of Mekong. Bhamo-Tali route. This does not augur well for the K'un-lung Ferry railway terminus.

### *Geographical.*

We had come from Hankow to Bhamo—2,360 miles—of which Distance travelled. 1,580 was by road and the balance by river ; and we had made a plane-table sketch of 2,000 miles of the route, of which only some 400 miles has ever been sketched before by a foreigner.

Of this 2,360 miles, about 500 miles have never been previously traversed by a foreigner. I have made no New country. remarkable geographical discoveries as this is difficult to do in a country which possesses the most elaborate maps of the whole empire executed in great detail.

I was able to get the approximate levels of every place at which we halted, as well as at many other Levels taken. points. Such data are useful in enabling one to form an opinion as to the nature of the country and the possibility of future railway construction, although of little geographical value.

It may be of interest to note that in my journey from Yü-nan to Bhamo (a distance of 1,020 miles) I went down 2,000 feet or more, and up again, over 20 times.

On 5 occasions the descent was over 3,000 feet, and up again about an equal height in a distance of under 6 miles. (See sections at end.)

### RAILWAYS AND POLITICS.

So much has lately been heard regarding railways and mining concessions in China that it would seem not out of place to say here a few words about the particular projects which must be of interest to the Anglo-Indian public.

It is, however, an aphorism that "the politics of China are the politics of railways," and it is difficult, if not altogether impossible, to separate the one from the other.

This being so, and "politics" being outside the sphere of an explorer, I am sure I may be excused if I only lightly touch on the vexed question of the advantages and disadvantages of railway extension from the British Indian Empire into the interior of China.

It has become an axiom that the strength of the British Empire lies rather in her Navy than in her Army. The command of the seas is to her as the very breath of existence.

China has a considerable sea-board (about 3,000 miles). I have already enlarged upon the capabilities of "Strategical" prospect of rail- that wonderful waterway, the Yangtze way from India to Ssu-ch'uan. river, and of the net-work of water- ways which exist throughout the greater portion of the 18 provinces.

Given that the British have command of the seas (without which we should indeed "command" very little), it appears to me doubtful to understand the "strategical" advantages of a narrow-gauge single line of railway from Burma or Assam to a province (Ssu-chuan), to which that great waterway, the Yang-tze, leads. The more so when we consider that the railway, before it can reach the Yang-tze in Ssu-chuan, will have to get over 3 or 4 great water-sheds, besides several smaller ones; and to cross 3 great rivers, and some lesser ones, which have cut beds for themselves, some 2,000 feet below the general level of the surrounding country.

Even then such a railway would, on arrival at the desired goal, reach a place (Cheng-tu), 1,100 miles, in a bee-line measured on the map, from the sea at Rangoon, and which is in direct communication by water (possibly in the future by rail also) with Shanghai, a place only 1,000 miles distant, and vastly superior in every way to what Rangoon can ever hope to aspire to.

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#### CONCLUSION.

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Then, again, the Chinaman has an unpleasant way of showing his contempt for the foreigner, by making insulting remarks, especially if he thinks he can do so with impunity. I remember once at Mess an officer calling for his servant, whereupon another servant called out, " Ah Chu don't you hear your dog barking for you." Unfortunately for Ah Chu and his friend a guest at the table understood Chinese—but I need not relate the harrowing sequel of my tale. Another drawback to Chinese travel is that China is, without exception, the most odiferous country I know; so if any of you wish to emulate Captain Wingate, my advice is don't, unless you have an angelic temper and a scent-proof nose.

I will now venture to make a few general remarks, which I trust may not be out of place. What first strikes the stranger in China is the extraordinary industry of John Chinaman and the thoroughness of his work. He is the hardest labourer in the world, and perhaps the most methodical. I will give you a few examples of his practicality. From our earliest infancy we have been taught the proverbial difficulty of taking pigs to market. We all know that one little pig goes to market and one little pig stays at home, but in China the little pig is never given a chance of staying at home; he is just crammed into a crate or basket slung on to a bamboo and then carried off by the Chinaman, thereby saving much time and temper, for no sane Chinaman would think of driving a pig to market. Another instance I may give is the Chinese wheelbarrow. Captain Wingate has shown you a photograph of one. It is certainly a most remarkable vehicle. As he has told you, on this the Chinese coolie will easily transport loads over 200 lbs. in weight, and I am sure that on good roads he could almost keep up with infantry. Then he is, as I have said, a most practical person. If a strong wind is blowing with him, he rigs up a mast and sail, and goes along gaily assisted by the wind. Another example of Chinese practicability I will give you is one which struck me much. In almost every respectable house or shop in China you will notice that the chairs or stools have marble seats. In my ignorance I asked why this was. " You no Savy? That belong vely cold. Vely good pidgin in hot season " " Yes! but what do you do in the cold weather? " " You no Savy nothing! Put on cushion of course, then chair vely warm for body." It is a simple matter, but only the Chinaman has put the idea in practice. I have often been asked my opinion on the Chinese as soldiers. It is difficult to give a satisfactory one. If you speak hopefully, the experience of the late war with Japan is cast in your teeth. If you take a disparaging view, then you are confronted with the legend of Gordon's ever victorious army. To my mind both views are misleading. Gordon's troops were well organised, well armed, and led by Europeans. Their foe was an ill-armed rabble. On the other hand, in the late war, the Chinese soldiers, as a rule, were untrained coolies with so-called officers whose sole object was to plunder their own men and their own Government, while their opponents were admirable soldiers in every sense of the word, better organised, I regret to say, than any British army I have yet seen. In my opinion, if you give the Chinaman good organisation and officers whom he can trust, he will be as good a soldier as most of our sepoys. He will never equal the Gurkha or the Sikh, because hereditary in-

instincts must tell, and in China the profession of arms has been a despised one from time immemorial.

Still an Anglo-Chinese army may some day be a very important factor in the politics of the Far East. I trust, therefore, that the experiment now being made by Major Bower at Wei-hai-Wei will prove a success. I think the fact which most forcibly impressed me when in China was the remarkable parallelism, the interesting and suggestive similarity between the China of to-day and the India of the eighteenth century. Let me quote from a magazine article I wrote in 1895:—" We have in China the same causes, the same political and social forces which brought about in India the substitution of foreign for native rule. On one side a tottering imperial autocracy similar to that of Aurungzebe and his successors : semi-independent viceroyalties and more or less autonomous provinces in many respects resembling the loose connection of the feudal States of India with the central authority at Delhi. An official class as corrupt, ignorant, and selfish as any Indian court of the last century could well produce. Great imperial armies without leaders or discipline such as Lake and Wellesley so easily vanquished ; and, finally, a people without patriotism ready to sell themselves to the highest bidder. On the other hand, we have in the treaty ports of China an almost exact reproduction of the Indian factories. In the commercial rivalries and political jealousies of foreign nations all the disturbing elements of intrigue and interference, such as the European rivals of the eighteenth century so effectually utilised for their own advantage ; and, finally, in the necessities of commerce the same incentives to territorial aggrandisement which the East India Company found it so hopeless to resist. For Delhi read Pekin ; for Madras, Calcutta, Pondicherry, Chandernagore read Hong Kong, Shanghai, Port Arthur, Kiaochau ; for French bugbear read Russian bogey ; for Tippu and Peshwa read Li Hung Chang and Chang Chi Tung : and then if you know the history of India under the last Moguls, you may form a forecast of China's probable destiny. It is not difficult to imagine contests like those of Clive and Dupleix repeated on the banks of the Yangtse or the Peiho.

*Sir Edwin Collen said :—*

At this hour I feel that I ought not to say more than a few words. We have just listened to a most interesting lecture on a subject which is of profound importance to England, and indeed to India—for even in the remote past we know that India traded with China, and at this moment, not only our great trade, but our national position in the Far East is intimately connected with that country.

The Indian frontier, for long stretches, marches with the Chinese frontier, we have had to send military expeditions from India to China, and numerous officers of the Indian and British services out here have rendered conspicuous services to their country in the explorations they have made. The names of Bell, Gill, Younghusband, Bower, Welby, Malcolm, Deasy, Pottinger form a roll of fame of which we may be justly proud. To this roll the lecturer's name must now be added.

He has done the United Service Institution good service in giving us an account of " Things Chinese " and of his enterprising journey.

Given that the British have command of the seas (without which we should indeed "command" very little), it appears to me difficult to understand the "strategical" advantages of a narrow-gauge single-line of railway from Burma or Assam to a province (Ssu-ch'uan), to which that great waterway, the Yang-tze, leads. The more so when we consider that the railway, before it can reach the Yang-tze in Ssu-ch'uan, will have to get over 3 or 4 great water-sheds, besides several smaller ones; and to cross 3 great rivers, and some lesser ones, which have cut beds for themselves, some 2,000 feet below the general level of the surrounding country.

Even then such a railway would, on arrival at the desired goal, reach a place (Ch'eng-tu), 1,100 miles, in a bee-line measured on the map, from the sea at Rangoon, and which is in direct communication by water (possibly in the future by rail also) with Shanghai, a place only 1,000 miles distant, and vastly superior in every way to what Rangoon can ever hope to aspire to.

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to be found in the Reverend Smith's book "Chinese Characteristics" from which I give a few condensed extracts.

"Of one thing we may be certain, 'commerce' alone will never reform the Chinese people. Adam Smith has defined man as a trading animal, and no two dogs exchange bones."

China possesses a very fine set of maxims and a beautiful moral code; "but political Government is its *ne plus ultra*." No Chinese ever lived who approached within measurable distance the man whom Mrs. Charles Kingsley describes her husband to have been.

Confucianism may be an excellent ethical religion, "but it has had plenty of time in which to achieve results," and—"the answer to Confucianism is China"—the China of to-day!

"What China now requires is much the same as Mr. Meadows declared her to be in need of 50 years ago. China wants 'funded civilisation,' by which is meant the material results of the vast development of Western progress."

"To attempt to reform China without some 'force from without' is like trying to build a ship in the sea; all the laws of air and water conspire to make it impossible!"

Since, therefore, there seems small hope of China reforming from within, surely we—the Anglo-Saxon race—have some right to decide whence shall come that "force from without" which is destined to carry to completion a task worthy of the greatest efforts of Christianity.

"If," said Lord Salisbury in June 1898, "if, I am asked what our policy in China is, my answer is very simple. It is to maintain the Chinese Empire, to prevent it from falling into ruins, to invite it into paths of reform, and to give it every assistance, which we are able to give it, to perfect its defence and to increase its commercial prosperity. By so doing we shall be aiding its cause and our own."

#### LITERATURE RELATING TO THINGS CHINESE.

*The standard works of reference on Things Chinese are—*

The Middle Kingdom	...	2 Vols.	By Wells Williams.
L'Asie Orientale	...	...	" Elisee Réclus.
A History of China	...	2 Vols.	" D. C. Boulger.
A Cycle of Cathay	...	...	" W. A. P. Martin.
The Government of China...	...	...	Published by Kelly and Walsh, Shanghai.
Life of Sir Harry Parker	...	...	By S. Lane-Poole.
Things Chinese	...	...	" Dyer Ball.
La Province de Yün-nan	...	...	" Emile Rocher.

*Books on Travel are—*

Travels and Researches in Western Yün-nan.	...	By E. C. Baber.
The River of Golden Sand	...	" Captain Gill.
The Long White Mountain	...	" H. E. M. James.
The Works of the Abbe Huc	...	Recently reprinted in English.
The Works of	...	Prejevalsky.
An Australian in China	...	By G. E. Morrison.

*The people are described in—*

Chinese Characteristics	...	...	By A. H. Smith.
Social Life of the Chinese	...	...	" Doolittle.
The Real Chinaman	...	...	" Holcombe.

*Commerce is fully treated of in—*

Report of the Blackburn Chamber of Commerce China Mission.			
La Mission Lyonnaise en Chine	...	(In French.)	
Report on the Trade of China	...	By Consul-General Jamieson.	
Letters to the Shanghai Chamber of Commerce.		" Baron von Richthogen.	
The Decennial Report on Commerce		By Chinese Imperial Maritime Customs.	

*The political situation is discussed in—*

Problems of the Far East	...	By Lord Curzon.
The Far East	...	" Henry Norman.
The Far Eastern Question	...	" Valentine Chirol.
The Break-up of China	...	" Lord Charles Beresford.
China in Transformation	...	" Colquhoun.
The New Far East	...	" Arthur Diosy.
China and Her Neighbours	...	" R. S. Gundry.
The Trans-Siberian Railway	...	" Vladimir.
Russian Advance in Asia	...	" Alexis Krausse.
China in Decay	...	" Alexis Krausse.
Peking to Petersburg	...	" Arnot Reid.
Intimate China	...	" Mrs. Archibald Little.

*The best scientific work in China is—*

China (4 Vols., only 3 published)	...	By Baron von Richthogen.
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The following excellent maps are available to the public:—

Atlas of the Chinese Empire	...	By Baron von Richthogen.
Map of China	...	" Bretschneider.
Maps of Provinces of China on large scale.	...	" Bretschneider.
Northern China	...	" C. Waeber.

The China Inland Mission Map of China.

*Note.*—Philip's Map of the Chinese Empire and Japan is a handy one from which to obtain a general idea of the Far East.

## DISCUSSION.

*Colonel E. G. Barrow, C.B., said:*

Captain Wingate has asked me to say a few words, presumably because, as Commandant of the Hong Kong Regiment, I had some opportunity of becoming acquainted with Things Chinese. I have acceded to his request, because, from sad experience, I know there is nothing more chilling to a lecturer than the silence which usually greets the chairman's invitation to the members of the institution to make a few remarks. I would begin by observing that the fact of Captain Wingate having traversed some of the most turbulent districts of China without getting into trouble is a remarkable testimony of his tact, discretion, and self-control, for I know nothing more calculated to rile an English gentleman than a hooting Chinese crowd. For these evil-looking children of Cain enjoy greatly greeting the stranger within their gates by pelting him with mud, brick-bats, and other still more disagreeable missiles. This, I may tell you, is a common experience even near Canton or Shanghai where the foreigner has been a familiar object for over half a century.

Then, again, the Chinaman has an unpleasant way of showing his contempt for the foreigner, by making insulting remarks, especially if he thinks he can do so with impunity. I remember once at Mess an officer calling for his servant, whereupon another servant called out, " Ah Chu don't you hear your dog barking for you." Unfortunately for Ah Chu and his friend a guest at the table understood Chinese—but I need not relate the harrowing sequel of my tale. Another drawback to Chinese travel is that China is, without exception, the most odoriferous country I know ; so if any of you wish to emulate Captain Wingate, my advice is don't, unless you have an angelic temper and a scent-proof nose.

I will now venture to make a few general remarks, which I trust may not be out of place. What first strikes the stranger in China is the extraordinary industry of John Chinaman and the thoroughness of his work. He is the hardest labourer in the world, and perhaps the most methodical. I will give you a few examples of his practicality. From our earliest infancy we have been taught the proverbial difficulty of taking pigs to market. We all know that one little pig goes to market and one little pig stays at home, but in China the little pig is never given a chance of staying at home ; he is just crammed into a crate or basket slung on to a bamboo and then carried off by the Chinaman, thereby saving much time and temper, for no sane Chinaman would think of driving a pig to market. Another instance I may give is the Chinese wheel-barrow. Captain Wingate has shown you a photograph of one. It is certainly a most remarkable vehicle. As he has told you, on this the Chinese coolie will easily transport loads over 200 lbs. in weight, and I am sure that on good roads he could almost keep up with infantry. Then he is, as I have said, a most practical person. If a strong wind is blowing with him, he rigs up a mast and sail, and goes along gaily assisted by the wind. Another example of Chinese practicability I will give you is one which struck me much. In almost every respectable house or shop in China you will notice that the chairs or stools have marble seats. In my ignorance I asked why this was. " You no Savey ? That belong vely cold. Vely good pidgin in hot season " " Yes ! but what do you do in the cold weather " ? " You no Savey nothing ! Put on cushion of course, then chair vely warm for body." It is a simple matter, but only the Chinaman has put the idea in practice. I have often been asked my opinion on the Chinese as soldiers. It is difficult to give a satisfactory one. If you speak hopefully, the experience of the late war with Japan is cast in your teeth. If you take a disparaging view, then you are confronted with the legend of Gordon's ever victorious army. To my mind both views are misleading. Gordon's troops were well organised, well armed, and led by Europeans. Their foe was an ill-armed rabble. On the other hand, in the late war, the Chinese soldiers, as a rule, were untrained coolies with so-called officers whose sole object was to plunder their own men and their own Government, while their opponents were admirable soldiers in every sense of the word, better organised, I regret to say, than any British army I have yet seen. In my opinion, if you give the Chinaman good organisation and officers whom he can trust, he will be as good a soldier as most of our sepoys. He will never equal the Gurkha or the Sikh, because hereditary in-

instincts must tell, and in China the profession of arms has been a despised one from time immemorial.

Still an Anglo-Chinese army may some day be a very important factor in the politics of the Far East. I trust, therefore, that the experiment now being made by Major Bower at Wei-hai-Wei will prove a success. I think the fact which most forcibly impressed me when in China was the remarkable parallelism, the interesting and suggestive similarity between the China of to-day and the India of the eighteenth century. Let me quote from a magazine article I wrote in 1895:—" We have in China the same causes, the same political and social forces which brought about in India the substitution of foreign for native rule. On one side a tottering imperial autocracy similar to that of Aurungzebe and his successors : semi-independent viceroyalties and more or less autonomous provinces in many respects resembling the loose connection of the feudal States of India with the central authority at Delhi. An official class as corrupt, ignorant, and selfish as any Indian court of the last century could well produce. Great imperial armies without leaders or discipline such as Lake and Wellesley so easily vanquished ; and, finally, a people without patriotism ready to sell themselves to the highest bidder. On the other hand, we have in the treaty ports of China an almost exact reproduction of the Indian factories. In the commercial rivalries and political jealousies of foreign nations all the disturbing elements of intrigue and interference, such as the European rivals of the eighteenth century so effectually utilised for their own advantage ; and, finally, in the necessities of commerce the same incentives to territorial aggrandisement which the East India Company found it so hopeless to resist. For Delhi read Pekin ; for Madras, Calcutta, Pondicherry, Chandernagore read Hong Kong, Shanghai, Port Arthur, Kiaochau ; for French bugbear read Russian bogey ; for Tippu and Peshwa read Li Hung Chang and Chang Chi Tung : and then if you know the history of India under the last Moguls, you may form a forecast of China's probable destiny. It is not difficult to imagine contests like those of Clive and Dupleix repeated on the banks of the Yangtse or the Peiho.

*Sir Edwin Collen said :—*

At this hour I feel that I ought not to say more than a few words. We have just listened to a most interesting lecture on a subject which is of profound importance to England, and indeed to India—for even in the remote past we know that India traded with China, and at this moment, not only our great trade, but our national position in the Far East is intimately connected with that country.

The Indian frontier, for long stretches, marches with the Chinese frontier, we have had to send military expeditions from India to China, and numerous officers of the Indian and British services out here have rendered conspicuous services to their country in the explorations they have made. The names of Bell, Gill, Younghusband, Bower, Welby, Malcolm, Deasy, Pottinger form a roll of fame of which we may be justly proud. To this roll the lecturer's name must now be added.

He has done the United Service Institution good service in giving us an account of " Things Chinese " and of his enterprising journey.

We cannot learn too much about a country with which we are so closely connected.

There is only one more remark I have to make. In the early part of the lecture Captain Wingate said that the question on every one's lips was " what is to be done with China." I confess I hope that the Chinese themselves will have something to say to the answer. But what we have to do, it seems to me, is to cultivate the best possible relations with the Chinese, to extend our influence by every means, and to take care with friendly firmness, that the wind from the north does not shut the " open door."

Captain Wingate is going to join Colonel Bower at Wei-hai-Wei, and I am sure you will all unite in wishing him every success, and in thanking him very heartily for the lecture to which we have listened with so much profit and pleasure.

*General Tyler said:—*

As President of the Executive Committee of this Institution, I would ask leave to say a few words. I think it is agreed that the lectures we have heard during this season have been full of interest and instruction, and that our military and geographical knowledge have received a considerable impulse. Lectures cannot well be delivered without a President. The duty of the President is, first, to preserve order and then to protect the lecturer. Happily in our Institution these functions he is seldom called upon to exercise. He is expected to deliver a criticism of the lecture, to emphasize the good points, disapprove the bad ones (if there are any), and to apply the lessons to the military teaching of the day. This requires of him considerable time and study, and it is not every one who is willing and able to afford that time.

Sir E. Collen has, on all occasions, willingly consented to perform the duties of President and has not begrudged the time and study necessary to speak at the lectures. I think I may say that his well-considered, weighty criticisms have added force to the education already conferred by the lectures.

I would ask leave to propose a vote of thanks to Sir Edwin Collen for the kindness he has shown in presiding at these lectures on so many occasions.

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After the lecture a series of lantern slides illustrating the subject were displayed by the Reverend M. Sanders and Dr. Ghose.

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Pao-shui  
 Chen-i-chou  
 Ch'u-ch'ing(Fu)  
 Mo-lung-chou  
 I-lung-ssu  
 Yang-lin-ssu  
 Pan-ch'iao  
 Yip-nan(Fu)

Wai-pum  
 Nam-hui  
 m-kham  
 si-kai (Salon)  
 Ying-hai  
 Chu-wi  
 Meng-hung  
 Man-tung  
 San-hou-chuang  
 Ta-shui-t'ung  
 Ma-li-pa (Tawino Plateau)



## THE TIDES OF VICTORY.

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BY COLONEL J. P. C. NEVILLE, A. Q. M. G., MADRAS COMMAND.

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"There is a tide in the affairs of men,  
Which, taken at the flood, leads on to fortune."

Those crises in the affairs of men, which our great Poet has so aptly likened to a tide, leading as they do to success or failure, may be observed in most of the concerns of life—in commerce, medicine, law, and love,—but in none perhaps more than in war. A study of the battles which have marked the epochs of military history will discover this tide in all its motions;—the ebb, the flow, the turning point where conflicting currents mingle, and the great tidal wave, sweeping all things before its resistless fury.

The great captains of every age, who have risen to the topmost rung of the ladder of fame, have been those who have been prompt to take this tide at its flood, and have thus been borne on to victory.

This talent for seizing the opportune moment is the offspring of military genius: it is not given to all commanders to acquire it, nor can it be learned from books.

The tides of victory differ from those of ocean in that, while the latter are governed by immutable laws, the former are apparently ruled by the wheel of that fickle goddess Fortune. Thus, while we see great commanders in the midst of strife and confusion taking "occasion by the hand," and thereby compelling victory; on the other hand, we have examples of notoriously mediocre captains who have in battle been borne as it were triumphantly on the very tidal wave of success, and others as famous for their skill and valour, while obstinately contesting every inch of ground, forced to succumb before the adverse chances of the day. Of late, while reading Shakespeare's great tragedy, some of the above thoughts occurred to me in connection with the speech of Brutus which heads this paper, and I thought it would be interesting to look up and put together some historical battles which might serve to illustrate the various phases of this tidal metaphor.

The first of these, the famous "Battle of the Spurs," gives us the bore, or tidal wave of success, under which condition one side seems to be stricken with a sudden panic from the first onset and utterly fails to check even for a moment the onward rush of the other, which sweeps it from the field.

King Henry VIII had very few of the warlike qualities of his father. He loved, it is true, the "pomp and circumstance" (never perhaps in our history were uniforms more gorgeous than in this reign), but the "glorious war" itself was not much to his taste, and was conducted by him in the fashion of a very luxurious picnic.

His campaigns were at once a pageant and a farce.



In the early days of his accession he expressed some military enthusiasm and was warmly applauded by his court and people generally. The popular amusement at that time was killing Frenchmen—lawn-tennis and golf had not been invented—and a war with France was the one thing needful to raise the young King to the height of popularity in England. In 1512, he joined a coalition against France to which he was incited by the Pope (Julius II) and Ferdinand of Arragon, one of his numerous fathers-in-law; and a well equipped army of some 10,000 men, under the Marquis of Dorset, was transported in a Spanish fleet to the Bidassad. This force being left by their treacherous allies to starve, mutinied and returned home.

The following year Henry resolved to take the field himself, and he took it in a leisurely way. Things could not be hurried—the troops required new uniforms—silken tents had to be prepared for King and court, so that it was the month of May before his advanced guard under Talbot was shipped to Calais.

About a month later, according to "Hall's Chronicle," His Majesty and retinue took leave of their wives, "which it was great dolour to behold," and started for France.

"And when all things were now ready," says the Chronicle, "accompanied with many noblemen and 600 archers of his guard, all in white haberdines and caps, he departed from his manor royal of Greenwich, the 15th day of June, and so he and the Queen, with small journeys, went to Dover Castle and there rested."

Shortly after his arrival in Calais, the King heard that a French Army, under the Duc de Longueville and the celebrated Bayard, was coming to the relief of Tirouenne, which insignificant town was being besieged by two strong corps, and—still leisurely—on the 21st July he marched out at the head of a magnificent army of 15,000 men to intercept them. In the neighbourhood of Ardes a strong body of French Cavalry was met with and the King, expecting a battle, dismounted and placed himself at the head of his forces to fight on foot like his famous ancestors. Bayard was for attacking the invaders at once, but the Duke, following the strict orders of King Louis not to risk a battle, withdrew his force.

Henry had been too late in preventing the French from throwing provisions and powder into Tirouenne. Having at last joined the besieging army, the King caused his splendid pavilions to be pitched.

They were bedecked with silks, blue damasks, cloths of gold, flags and royal standards, but very heavy rain coming on, he was forced to take refuge in a wooden hut.

Towards the end of July the English were joined by the Emperor Maximilian who had been provided with a subsidy of 120,000 crowns to raise troops, which sum he appears to have diverted to his other necessities, as he was accompanied by only a small escort. Henry decreed a magnificent reception for this most Christian Prince: his men and horses were glittering masses of riches and finery. A foreign chronicler states that "common men looked like captains and the captains like crowned Kings."

A terrific storm rather marred the ceremony, and drove their majesties to King Henry's hut. Up to this time since six or seven weeks had been wasted in the siege, and so un-military were the operations

that all the time the town was kept supplied with provisions and munitions of war by the Comte d'Augoulême. On the arrival of the army of Calais, these communications were interrupted, and about the middle of August the French Army, about 12,000 strong, advanced from the direction of Plangy with a view to relieving Tirouenne under cover of a pretended battle.

On the morning of the 18th the French appeared on the ground. Henry and Maximilian immediately crossed the river and drew up their battle in array.

The Emperor, who, on the very same field, had won a victory some thirty years before, commanded the English Army, wearing the Red Cross of Saint George upon his sur-coat and the Red Rose of Lancaster in his helmet.

The battle opened by a brilliant charge of the French cavalry who succeeded in throwing some powder and provisions within reach of the walls, and then wheeled round to rejoin their infantry. At this moment they were charged by the English mounted archers and some squadrons of German chivalry. The English with loud shouts of "Saint George!—Saint George!" bore down upon the retreating mass of French, who, striking spurs into their horses, fled in the utmost confusion from the field, followed by the infantry.

Their gallant leaders, disdaining to fly, were taken prisoners, amongst whom were the Duc de Longueville, the illustrious Bayard, Bussy d'Ambroise, Clermont d'Anjou, La Palisse, La Fayette, and many other nobles of high rank.

On being rallied by our bluff King Hal on the speed with which they left the field, Bayard laughingly replied—"Sire, *ce n'étoit qu'une affaire d'épérons!*" This *mot* so pleased the English King that he dubbed the fight, which took place by the village of Guinegaste, "The Battle of the Spurs," by which name it has since been known.

If Henry had pursued the French this day, he might have inflicted a crushing blow. A Swiss Army of 20,000 men had crossed the Jura range and penetrated into Burgundy. Paris was in a state of panic between the two armies, but Henry wasted another week before Tirouenne, and the opportunity for combined action with the Swiss was lost.

Tirouenne capitulated at the end of August, the garrison marching out with the honours of war (the English King loved a parade).

The town, however, in deference to the ancient animosity of Maximilian, was totally destroyed. King Henry having wasted more time over the capture of Tournay which was of no use to anyone but Wolseley, who obtained its rich Bishopric, and, having disgusted the Swiss into making an advantageous treaty with France on their own account, returned to England in October. The next battle is one which illustrates the flow of the tide. In such conditions there is no panic, as at Guinegaste, and more stubborn fighting on the part of the defeated side, but the tide of victory seems to set steadily in one direction from the commencement, and there is never a moment's doubt as to which force will be the winners of the day.

The example I have selected is the battle of Maida, fought in 1806 between a British force under Sir John Stuart and the French General Regnier in Calabria.

This engagement was a remarkable one in several ways, and perhaps no battle, in which they were defeated by us, has been more grossly misrepresented by French writers. At the commencement of the year 1806 the French had subdued the whole of Italy except the most southern extremity, and a few mountainous districts in the Abruzzi. Joseph Buonaparte had been thrust by his omnipotent brother on the throne of Naples, and almost the last spark of independence and resistance on the part of the patriotic inhabitants had been stamped out.

General Regnier commanded a French division of all arms in Calabria, and there eternally disgraced his name by the most cold-blooded butchery and every kind of diabolical excess. The country was ablaze from end to end. The fugitive Bourbon court sent over from Palermo and Messina money, arms, and a horde of irregular partisans. The French captured Maratea and massacred the entire population with the greatest atrocities.

They failed, however, to take Amantea—Reggis was re-taken from them—the Castle of Scylla which had surrendered to the French was invested, and Regnier was forced to retreat towards Monteleone. In the month of June, Sir John Stuart, commanding the British forces in Sicily, determined to cross over into Calabria. His total force did not amount to 5,000 men, and of these a third were foreigners—Corsicans and Sicilians in our pay.

On the 1st of July, he effected a landing in the Gulf of Sant Eufemia, not far from the town of Nicastrs.

Regnier, on hearing this news, immediately concentrated his detachments and made a rapid march to attack the English before they could effect a junction with the insurgents. He expected to find Stuart encamped on the shore, his position defended by the fire of the shipping and earthworks, and French historians have explained away their defeat and heavy losses by speaking of the overwhelming fire of the ships and of some "murderous masked batteries."

This is all pure invention. As a matter of fact, Sir John, leaving the shore, pushed boldly inland in search of Regnier. The ground was very rough and much cut up by water-courses, marshes, and thickets of myrtle and wild geranium, so that Stuart, who had scarcely a horse with him, could only have moved very light field pieces. The whole of the artillery Sir John had brought with him consisted of ten 4-pounders, four 6-pounders and two howitzers, and from this scarcely formidable artillery not a shot seems to have been fired during the action. Maida was essentially a battle of bayonets. The English had no cavalry and scarcely used their muskets except as pikes.

On the evening of the 3rd July, Stuart received intelligence that Regnier was encamped at Maida, about 10 miles from his landing place, on the edge of the lower hills that slope down from the Apennine range; that his force consisted of 4,000 infantry, 300 cavalry, and four

guns, and that he expected to be joined in a day or two by a second division of 3,000 men. Stuart determined to attack immediately, and, leaving behind four companies to protect his stores which were placed in a light earthwork on the shore, he set out the following morning for Maida.

The day was intensely hot and the British troops suffered severely, but they struggled on until they came in sight of Regnier's position. The French were encamped below the village of Maida on the side of a wooded hill. Their flanks were protected by dense thickets of impervious underwood, and their front covered by the river Amato, which, although at this season fordable everywhere, had on both banks a broad expanse of marshy ground.

"Had he remained in this position"—says Stuart in his despatches—"the difficulties of access to him were such that I could not possibly have made an impression upon him."

Regnier, however, elected to come down and fight in the plain. The reasons for this are variously given. Some affirm that it was to give scope for the action of his cavalry, of which arm he could perceive during their advance that the English were deficient. There is, however, another and more likely reason given.

Regnier, a vain, boasting, self-confident man, had been badly beaten in Egypt by this very same Sir John Stuart, and he was eager to wipe out the disgrace of his previous defeat. Indeed, the personal feeling was strong on both sides, for Regnier had written a book about Egypt in which he arrogantly declared the English had neither courage nor skill, and were totally unworthy to be called soldiers—an insult which every British officer and soldier on the field was burning to avenge.

Whatever may have been the true reason, it is certain that Regnier left his strong position on the morning of the 6th, and came out into the plain. His advance was in double column, and as he approached, Stuart perceived that his forces were far more numerous than he had been led to expect. As it happened, he had been joined the preceding night by his expected division, so that now his strength was 7,000 foot and 300 horse.

After some skirmishing at close quarters to cover the deployment on either side, by 9 o'clock the general engagement commenced. The fighting was hottest on Stuart's right. On that flank were some British Light Infantry and a few foreigners under Lieutenant-Colonel Kempt and Major Robinson.

Directly opposed to them was a famous French regiment, the 1st Light Infantry.

When at a distance of about a hundred yards, each side fired a couple of rounds and then, as if by mutual agreement, advanced on each other with the bayonet.

The French were veterans whose boast was that no troops in Europe could stand their bayonet charge. The English were smooth-faced boys who had never before been under fire. As they advanced, Colonel Kempt, seeing his men were suffering from the heat, halted his line and directed them to throw away the blankets they carried on their backs.

The French seeing this thought they were about to fly and, quickening their pace, came on with fierce shouts.

Suddenly from the English ranks the word "charge!" was given, and with a loud "hurrah!" the whole British line rushed forward like a wall driving the French before them in the greatest confusion. In vain they endeavoured to re-gain the hill behind them: they were too late; the English were upon them. "They went down"—said an Italian witness of the fight—"like grass before the mower." Regnier, who was galloping about the field storming and cursing his men, seeing his left defeated, threw his horse and foot on the English left flank. This was composed of Cole's Brigade, which included some companies of Grenadiers, and these met the attack without moving an inch, so that presently Regnier's foot and horse were beaten back in disorder.

The French General, now perceiving that he was getting the worst of the fight, not only on both flanks, but all along the front, directed his squadrons to wheel round the English left and deliver an attack on their rear.

At this very moment Lieutenant-Colonel Ross, who had that very morning landed from Messina with the Sir John Stuart's total of his 20th Regiment,\* and who had marched forces which was 4,795. with breathless speed to the scene of action, arrived in rear of Stuart's left, and taking advantage of a slight cover, he poured such a steady and well-directed fire into the wheeling squadrons, who were thus taken in flank, that in a few moments they all melted away and fled from the field. This was Regnier's last struggle: the rest was all "*saute qui peut!*"

The battle was really decided on Stuart's right, for when the French saw their crack regiment of veteran troops so completely "*rossé*," they lost heart all along the line. Regnier lost on this occasion some 1,500 men, and 1,000 prisoners fell into our hands.

The British losses were small, being but 45 of all ranks killed and 282 wounded.

The next example will briefly set forth the circumstances attending the most memorable defeat that a British Army has ever sustained on the battle fields of Europe.

Almauza (1707) and Fontenoy (1743) are the only two battles in which an English Army has been fairly beaten from its ground by sheer fighting.

Neither of these battles, however, can be fairly considered a disgrace to our arms, for at Fontenoy our Dutch allies ran away; and if we deduct their number from the total (33,000) of the whole confederate army, we shall find that the British and Hanoverian forces fought against more than triple their own numbers, for Marshal Saxe had fully 60,000 men on the ground.

During the war of succession, our troops under the Earl of Peterborough had scattered the Spanish troops who took part with the French wherever they met them, and had defeated the French too in every encounter. Peterborough, however, though undoubtedly possessing many brilliant qualities, was not the man to carry to a successful issue a contest of such magnitude. After a short and shining career he

left the country. He had managed to quarrel with all the leading men of our allies in Spain, and caused dissensions between our officers and theirs. After his departure Lord Galway took command of English and Portuguese forces. He had the disadvantage in the eyes of the British soldiers of not being an Englishman. He was in fact a Frenchman, by name Rouvigny, and was one of the foreign generals brought over to our country by William III who raised him to the Peerage for services in Ireland.

In the preceding year (1706), Galway, moving from the Portuguese frontier, had taken possession of Madrid.

The Bourbon Prince, however, having received great reinforcements from France, turned back to the Spanish Capital and compelled Galway to evacuate it. His retreat to the Portuguese frontier in the front of a far superior force was conducted with great skill and without loss.

It had been arranged that, in the spring of 1707, the allies should unite all their forces and again advance upon Madrid by the way of Aragon. The Archduke Charles, however, hearing of the great reinforcements that had joined his rival Philip, instead of remaining with the main army, marched away into Catalonia in order to defend that province which was attached to his cause.

He proposed that Galway with his English and Dutch, and the Marquis Das Minas with the Portuguese troops, should take up a defensive position so as to cover the frontiers of Aragon and Valencia until fresh troops and supplies should arrive from England or from Italy. Galway and Das Minas, however, would not agree to this. They were very badly supplied in every respect, and saw no prospect on these frontiers of a subsistence for their troops.

These two Generals then, on their own account, marched to the frontiers of Castile where they seized several of the enemy's magazines and replenished their stores of provisions.

They then proceeded to lay siege to the town of Villena in Valencia, but before a breach could be effected, they were warned of the approach by forced marches of the famous Duke of Berwick in command of an army of French and Spaniards. Galway and Das Minas immediately raised the siege of Villena and advanced to meet Berwick.

They met on the plain of Almazara on the 24th of April, and the result was one of the hardest fought battles of this war.

The English, Dutch, and Portuguese Army was far inferior in numbers to the Duke of Berwick's force. They had very few cavalry and that was very indifferent in quality, but notwithstanding, the English and Dutch fought most bravely for six hours. Again and again the most furious charges of the French cavalry were repulsed by these steady infantry columns, and even when on both wings the French and Spaniards seemed successful, their centre was cut through and broken and the main body of their infantry completely defeated. Eventually, however, owing to his numerical superiority, Berwick was victorious: Galway and Das Minas were both wounded, 5,000 of their troops were killed, and in the course of that and the following day the rest of their little army surrendered to escape starvation.

At Almazuza the English and Dutch had all the fighting ; the Portuguese really counted for nothing. The disparity of numbers was therefore immense, and no honour was lost by us in losing such a battle. It is curious that in this battle the English were commanded by a Frenchman and the French led by an Englishman.

The above example illustrates the ebb of the tide. The brave old Galway on this occasion fought with the greatest valour, heading himself a bold charge made by the English Dragoons, and in all his dispositions displayed the skill of a veteran General ; his troops too, with the exception of the Portuguese, fought with the most determined bravery, and yet all was useless. The tide of victory seemed to have set dead against him, and the result was un-merited defeat.

The next, and last battle to be described, will show the conflicting currents where victory seems to waver, declaring first for one side, then for the other, until eventually, at the turn of the tide, a skilful manœuvre decides the fate of the day. Malplaquet (1709) was the last battle fought by the famous Duke of Marlborough, and, as far as numbers and hard fighting go, it was the greatest of his many victories. The forces on this occasion were nearly equal, the French having 94,000 men and 105 guns, while the allies mustered 93,000 men and 100 guns : the French, however, had the great advantage of strongly fortified positions and carefully constructed entrenchments which are considered to have added to their strength as much as another corps of 30,000 men. The French were commanded by Maréchal de Villars and Boufflers, while the allies were led by Marlborough and Prince Eugene. As the morning of this eventful day (11th September 1709) dawned, a thick mist overspread the ground, concealing the opposing armies from each other.

As early as 3 A.M. divine service was solemnly performed in the camp of the allies, after which the troops steadily marched from their bivouacs to their respective posts.

Under cover of the fog the pieces composing the grand battery of Marlborough's centre were brought into position and covered by an epaulement, while on the left the Dutch moved up their heavy guns. At half past seven o'clock the sun shone out, and as soon as they could see to aim, the artillery on both sides commenced a terrific cannonade. Immediately on the commencement of the artillery duel, de Villars and Boufflers repaired to their respective posts while the two confederate Generals also separated, Eugene to direct the movements of the right and Marlborough those of the centre and left. In spite of the very strong position of the French, Marlborough, with his usual dash, determined on a front attack, and the battle began by a movement against the French centre and right in two dense columns—one commanded by the Prince of Orange and the other under Count Lottum. The Dutch column halted out of grape-shot range and formed in three lines ; while that of Lottum moved forward, regardless of the fire, to the rear of the grand battery, and wheeling to the right, also formed in three lines. As these movements were in progress, Schulemberg advanced at the head of 40 battalions ranged in three lines.

After a short lull in the fire, at 9 o'clock the signal for attack was given by a general salvo from the grand battery. Schulemberg at once advanced along the edge of the wood of Sart upon the projecting point

of the enemy's left wing, while Lottum marched round the grand battery to attack the other face of this angle. As he cleared the ground, Lord Orkney deployed his 15 battalions to cover his left and face the hostile centre. Three battalions under Gauvain managed to get into the wood of Sart unperceived by the enemy. Eugene now joined Schulemberg whose troops he found crossing several small streams and entering the wood. The French allowed these troops to advance to within pistol range and then opened with a tremendous volley all along their front which drove the leading regiments of the allies a furlong back or more. A very hot musketry fire then ensued, and an advanced brigade of French under Charost was driven from an entrenchment protected by *abatis*.

The Austrian battalions on our right, being bogged in a morass, made a circuitous movement to their right and fell in with Gauvain's brigade in the wood.

They met, however, with many obstructions and were checked by Charost's troops in their front, so that for some time on our right no ground was gained.

In the meanwhile Marlborough placed himself at the head of Count Lottum's troops and led them against the French centre.

In spite of volleys from the Brigade du Roi, they passed some enclosures, descended into the stream and waded across the marshy ground without breaking their ranks. Here, however, they were met by a very heavy fire, and in spite of the most determined efforts to carry the breastworks, they were repulsed by the French who were led by de Villars himself. During this struggle in the centre, General Withers was advancing in silence through the woods towards La Folie, by which manœuvre he distracted the attention of the enemy without becoming engaged. On the right, Eugene and Schulemberg brought up fresh troops from their second lines with which they filled up gaps and extended their flanks. They then again attacked and dislodged the brigades of Charost and La Reine, but failed to force back those of Picardie and La Marine.

Count Lottum now returned to the attack, while Marlborough took command of d'Auvergne's cavalry to support him, and the Duke of Argyll deployed a British Brigade of the second line on the left. The centre attack being thus extended, the troops on the left came up opposite an opening in the French entrenchments and endeavoured to effect an entrance. The approach, however, was across an almost impassable marsh, and while our men were struggling in the bay, the active French General Chemerault with 12 battalions from their second line passed through the breastworks and prepared to fall on the British left flank.

At this moment de Villars, perceiving Marlborough and his staff at the head of the Cavalry Division, ordered Chemerault back, only just in time, for in another moment our squadrons would have been upon them.

Lottum's left now pushed forward, having crossed the morass, and effected an entrance into the entrenchments, thus turning the right of the Brigade du Roi, and forcing the French gradually back into the wood behind.



On the French left the brigades of Champagne and Picardie, pressed on either flank by Schulemberg and Lottum, were forced to take refuge inside an *abatis*, and the Marine Brigade, after a most stubborn fight, was compelled to follow them. The whole of the rest of the troops on the enemy's left retired in disorder through the woods pursued by the Danes, Saxons, and Hessians, but obstinately disputing every tree.

While these events were in progress on our right and centre, a still fiercer fight was raging on our left flank.

To understand what happened in this quarter, we must go back to the beginning of the action.

After the right (Schulemberg) had been engaged for half an hour, the impetuous Prince of Orange on the left, impatient of further delay, although as yet unsupported by Withers' corps and without any orders from Marshal Tilly, determined to commence the attack on the enemy's right. According to orders issued the previous evening, the left of the whole front was entrusted to Major-General Hamilton and Brigadier Douglas with the Scottish Brigade whose orders were to enter the wood in four lines and attack the Grenadiers who covered the enemy's right flank. Nine battalions, under Lieutenant-Generals Spaar and Oxenstiern, were to advance against the salient angle of the entrenchment next the wood, and to their right six battalions in three lines under Lieutenant-Generals Dohna and Heyden were to attack the battery on the Malplaquet road.

Generals Wilderen and Rauk, with four battalions in two lines, were to skirt the hedges of Bleron and force the entrenchment on the right of the battery.

Seven battalions under Major-Generals Pallant and Ammama had been told off to act on the defensive, but these now received orders to advance in three lines and attack the point of the projecting entrenchments defended by the brigades of Laonois and Alsace.

The above corps were supported by the Prince of Hesse Cassel with 21 squadrons in two lines and the corps artillery.

A few squadrons were detached between Aulnoit and the farm of Nivergies to watch the opening in rear of our left.

On the word to march, the whole of this force was instantly in motion, led by the gallant Prince of Orange at the head of the first nine battalions under a tremendous storm of grape and musketry. He had hardly moved a dozen paces before the brave Oxenstiern was killed by his side and several of his Aide-de-Camps dropped.

His own horse was immediately afterwards killed under him, but rushing forward on foot, he still led the advance.

As they passed the opening of the great flanking battery, whole ranks were swept away, but still they pressed on and carried the entrenchment at the point of the bayonet. Before they could deploy, however, the Dutch Guards and Highlanders were driven back from the post by an impetuous charge of troops from the French left who had been rallied and brought up just in time by Marshal Boufflers himself.

At this moment the corps under Dohna moved gallantly against the battery on the road to Malplaquet, and rushing through the embraasures, drove out the defenders and captured some colours.

Before, however, they could reach the line of breastworks in rear, they were mown down by the battery on their flank. A dreadful carnage here took place. Spaar was killed and Hamilton wounded, and the lines began to waver and fall back.

The heroic Prince of Orange now mounted another horse, and when that was shot under him, still undaunted, he rallied the nearest troops, seized a standard from the regiment of Mey and marching almost alone on foot to the entrenchment, he planted on it the colour, crying "follow me my friends; here is your post!"

Again the allied troops rushed forward in response to this appeal, but the opportunity had passed. The French second lines had come up, and the whole entrenchment bristled with bayonets and blazed with fire. The brigade of Navarre which had been sent to reinforce the enemy's centre was now recalled, and the French troops, getting out of the control of their officers, opened the entrenchment and made a furious charge. The disordered battalions of Dutch were forced back, losing several colours, and their advanced battery fell into the enemy's hands.

Bouffiers, seeing the success of this impromptu counter-attack, now sent his horse grenadiers to pursue the advantage.

But at the same time the Prince of Hesse advanced his squadrons, and the Dutch, seeing support at hand, very quickly and skilfully rallied their broken ranks and, facing about, presented so firm a front that their assailants, overawed, halted, and then retired.

In these attacks over 2,000 men were killed and double that number wounded; two battalions of Blue Guards being almost entirely annihilated.

While this terrible conflict was at its height, Baron Fagel led on the seven battalions under General Pallant to storm the projecting entrenchment near the farm of Bleron. Notwithstanding a very heavy fire, they forced their way through the enclosures which surrounded the farm and drove the brigade of Laonois from the parapet, but Steckemberg, coming up with fresh troops, made such a vigorous assault on the somewhat disordered victors that they were obliged to relinquish the post. Seeing the state of affairs in this direction, Rantzan, who, with four battalions of Hanoverians, was posted at the edge of the wood of Tiry with positive orders not to move, nevertheless now sent two battalions to assist Pallant. The attack was now renewed, and a second time the entrenchment was carried, but mown down by grape-shot, and charged by Steckemberg, the assailants were again repulsed with tremendous loss.

While this new assault was in progress, a party of French quitted their entrenchment and advanced to line a ravine opposite Rantzan's post, and the latter at once attacked them with his remaining two battalions. At this moment Marlborough rode up and ordered Rantzan back to his original position from which he was not to move. Eugene now joined Marlborough and both commanders proceeded to the left when the Dutch, having re-formed, were slowly retreating beyond the range of grape-shot. While they were giving orders to restore the formation of the left wing, a British galloper arrived with news that on our right the French had assumed the offensive and

were attacking with great fury. What had happened was this. de Villars having sent several messages to Boufflers asking for help (which the latter, having his hands full, could not afford to send) drew from the centre the Irish Brigade, with that of Bretague and La Sarre, and with these fresh troops and his rallied forces made a furious charge upon the British and Prussians in the wood of Taisnière, the latter giving way before the impetuous onset of the Irish. The wood, however, was so thick that both sides were quickly broken up into small groups and a fierce skirmish ensued.

At this crisis Marlborough rejoined the right centre and Eugene the right, and the troops, cheered by the presence of their leaders, made fresh efforts.

Schulemberg made his way round the marsh on the right and entering the wood pushed the enemy before him, but here again the thickness of the undergrowth checked the movements of the men and broke up the lines into groups.

At this moment the brave Eugene, whilst rallying his men, was struck by a musket ball behind the ear. Refusing, however, to have his wound dressed, he rushed into the fight at the head of his brave Germans who now pressed forward into the opening between the woods of Taisnière and Sart. In this movement he was supported by Withers who made the following disposition of his forces: the cavalry division behind the hamlet of La Folie, with four battalions on their left flank. With his remaining fifteen battalions Withers lined the hedges of La Folie. The Danish and Saxon cavalry attached to his corps he sent round the right flank to fall on de Villars' left.

These squadrons were caught in their deployment by the Chevalier du Rosel, who, with his Carabiniers, charged them when only six squadrons had formed line, and drove them back in disorder.

Notwithstanding this repulse, it was the progress of Withers' corps which hastened the retreat of the enemy from the wood of Taisnière and alarmed de Villars for the safety of his left. In the renewed fighting, which now began, Chemorault and Pallavicini were killed and several French brigades got mixed up in considerable confusion in the marshes and thickets. Unable to hear or recognize their own officers, there was no cohesion or design. Some were for pushing forward, some for falling back, and de Villars, recognising that the position was a critical one, now hastened to restore something like order without losing the ground so hardly gained. To this end he now brought up his Irish Brigade, and sent the brigades of Charost and Du Roi to hold Withers in check in the nearest hedges of La Folie. To their right he posted the brigade of Champagne with those of Goudrin and Tourville as a reserve in rear, and behind them on the plain he posted his cavalry. The regiments of La Reine's Brigade and some troops under Xaintonges supported the Brigade Du Roi on the left rear, de Villars also formed up twelve battalions in two lines at 50 paces from the edge of the wood.

At this moment Eugene at the head of five German regiments advanced out of the wood and opened a destructive fire. The French, headed by de Villars, charged with the bayonet and drove Eugene's troops back into the wood of Taisnière from which they did not again

advance. In this fight de Villars had his horse shot under him, and immediately afterwards was hit in the knee and carried from the field to Quesnoy. This sanguinary battle had now lasted four hours; and although his left had been defeated, and but a partial success achieved on his right, Marlborough's military genius enabled him to perceive that, in spite of great losses and very little apparent gains, he had in reality realized so much of his original plan that he had compelled the enemy to employ almost all their infantry on both flanks, thereby greatly reducing the strength of their centre, where all along he had decided to strike the decisive blow. The time had now arrived: this was the turn of the tide, and our great Captain knew how to take it at the flood.

While the battle had been raging on the wings, the allied centre had been waiting for this moment. (This was the reason that Rantzau was not allowed to move.)

It will be remembered that at daybreak Lord Orkney had deployed his fifteen battalions facing the French centre. These British troops, the *élite* of his army, Marlborough had reserved for his *grand coup*.

For four hours they had been eagerly awaiting the order to advance, and now the order came.

As Lottum had gained ground, Lord Orkney had gradually advanced his corps.

He had behind the Prince d'Auvergne with 30 squadrons of Dutch Cavalry in two lines. In their rear was the British cavalry under Lieutenant-General Wood; the Prussians and Hanoverians under Bulan, and the whole of the Imperial Cavalry commanded by the Duke of Wirtemberg and the Count de Vehlen.

Lord Orkney advanced in one line, and with a single charge took possession of all the French redans, overpowering the Bavarian and Cologne Guards. The heavy reserve battery of the British centre was now brought up and turned against these troops, while the guns of the allied grand battery moved rapidly right and left and opened a tremendous fire on the hostile cavalry which was drawn up on the plain beyond.

The French horse fell back; on which Rantzau, advancing his two battalions, fell on the left of the French and Swiss Guards and dislodged them.

At the same moment the undaunted Prince of Orange renewed his attack on the left and drove the brigades of Laonois and Alsace out of the projecting entrenchment, now the grave of so many brave men.

Meanwhile the Prince d'Auvergne had advanced his cavalry beyond the French works and began to form them for attack.

The crisis of this memorable battle was now arrived. d'Auvergne was charged by the French cavalry when only a portion of his first line was formed, but his squadrons stood firm and repulsed the attack. But the retreating masses bearing to their right and left opened the centre, and here appeared the splendid Household troops, the Gendarmerie of France, headed by Marshal Boufflers in person.

The allied cavalry, but partially formed and somewhat shaken by their late shock, was in no condition to stand this new assault before which they were driven back into the entrenchments. Lord Orkney meanwhile lined the parapets with his troops and poured in

such a heavy fire on the victorious squadrons, aided by a cross fire of the batteries on the flanks, that Boufflers was forced to retire. Three times the Frenchmen charged, and three times were hurled back crushed and broken by this disastrous fire.

Marlborough now came up with the second line of British and Prussians under Bulan and Wood, and charging the broken Gendarmerie would have swept them from the field, but for the approach of a formidable force of 2,000 cavalry from the enemy's right, also led by Boufflers himself. These were the gardes du corps, the mousquetaires, light horse, and horse grenadiers of the Royal Household.

Their charge was irresistible : they rode through the first and second lines, and threw the third into confusion. But at this moment Eugene arrived at a furious gallop, at the head of the whole of his cavalry division, and the French, taken in flank and galled by the heavy fire of the British infantry, fell back rallying ; the French renewed the attack, but they were now outnumbered and driven behind the stream of Camp Perdu.

During the progress of this cavalry fight, the Prince of Hesse on the left seizing the opportunity of the hostile horse, having been withdrawn from this part of the field, pushed forward in column, passed the redans, and wheeling to his left, fell on the flank of the French infantry of the right wing.

This daring manoeuvre decided the battle.

The French, driven in a crowded mass to their right, were attacked and routed by the Prince of Orange.

Boufflers now cast an anxious eye over the field. He saw his centre pierced, his right dislodged from their position, communication with his left cut off ; but still, as his best cavalry troops were now rallied and ready for renewed action, he was determined to continue the contest. At this moment, however, he received intelligence that Legal, who commanded his left, was in full retreat with his cavalry and 50 battalions under Puysegur : he therefore reluctantly ordered a general retreat on Bavai.

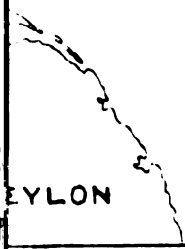
The French retreat was conducted in a masterly manner which was much applauded by Eugene and Marlborough.

The allies were too exhausted to pursue with any effect. Their losses were very heavy, being little short of 20,000 men killed and wounded, while the French loss was about 14,000. Of course the French, as they always do, endeavoured to extenuate their loss. In a letter to the French King, de Villars limits it to 6,000 men. de Villars was a most valiant and skilful general, but was given to gasconading, as the following extract will show :—

“ Si Dieu nous fait la grâce de perdre encore une pareille bataille, votre majesté peut compter que ses ennemis sont détruits : enfin comme me le mauda M. de Voisin, ce qui avoit paru une bataille perdue, devint une victoire glorieuse, après qu'on en eut connu les circonstances ; pusique nous ne perdîmes pas six mille hommes.”

It must be borne in mind that the French fought within an entrenched camp, partially covered by thick woods. Had the battle taken place in the open, it would not have lasted half the time, nor probably have cost the allies one-quarter of their heavy loss.

82°



EYLON

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## WHEN AND WHY DID WE FIRST TAKE DEHLI?

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LECTURE BY MAJOR-GENERAL BERESFORD LOVETT, C.B.,  
C.S.I., R.E

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*Tuesday, 5th September 1899.*

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MAJOR-GENERAL SIR EDWIN COLLEN, K.C.I.E., C.B.,  
IN THE CHAIR.

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I have given my Lecture the title "When and why did we first take Dehli?" because this event was the turning point in a series of most interesting military and political incidents that took place a century ago, which definitively secured for us the position of the Paramount Power in India. In order to enable you to understand the circumstances under which we took the famous city of Dehli, it is necessary that I should enter into some preliminary observations, and, firstly, I should like to speak to you about the Ruler of British India a hundred years ago.

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Richard Colley Wesley or Wellesley, as he and his brothers chose to write their surname, came out to India as Governor General, in his 37th year, in 1798. He was the parliamentary nominee for this responsible post, and he, like many of his predecessors and successors, came out pledged to the Court of the Directors of the Honourable Company to maintain a pacific policy. But circumstances were too strong for him, and he felt himself compelled to go to war, or else see our rule pass away into the hands of the French. That was the alternative, and it is curious to see how our expansion in India has resulted from our endeavours to check French ambition. Had it not been for French competition in Southern India, we should possibly have continued to this day to remain traders as we are in China, enjoying, under agreements with native princes, certain privileges on the sea board; but the fear of French supremacy near our settlements was felt to be incompatible with our very existence in India.

Therefore one of Wellesley's first acts was to disband a body of 14,000 native troops officered by Frenchmen in the service of the Subedar of Haidarabad, generally known by his title of the Nizam-ul-Mulk, or, more shortly, the Nizam. These troops were replaced by a body of sepoy with English officers whose pay was assured by the cession of certain territory whose revenue was sufficient to secure



the necessary amount. The agreement so made was called a subsidiary treaty, and here let me point out that the word *subsidiary* in diplomacy does not mean to imply inferiority or being subordinate or supplementary which is the usual acceptation of the term ; but it means simply relating to a subsidy of money. The body of troops thus brought together was called the "Haidarabad Subsidiary Force" and exists to this day. This force must not be confounded with the Haidarabad "Contingent" which was organised at a later date.

Marquis Wellesley followed up this step towards excluding French influence, by attacking, under ample provocation, Tipu Sultan in his capital of Siringapatam with the result that we all know. His brother, Colonel Arthur Wellesley, who preceded him in India by little more than a year, was transferred from commanding the "Haidarabad Subsidiary Force" to command a brigade before Siringapatam, and was succeeded in the command of the "Haidarabad Subsidiary Force" by the famous Colonel Stevenson who was subsequently Arthur Wellesley's right-hand man in his memorable campaign against the Mahratta Confederacy. The third step taken by Marquis Wellesley to consolidate our power in Southern India was to annex the Nawab of Arcot's territories for treason. We can now turn to the map and see how this masterful politician left the southern portion of the peninsula before he turned his attention to our northern possessions. The map shows the extent of the Madras Presidency at the beginning of this century, and it remains much the same now.

In Bengal the Governor General on very cogent grounds, which it is not here necessary to detail, found himself compelled to obtain from the Nawab Wazir of Oude, the cession of Rohilkhand and a portion of the Doab. He appointed his brother Henry as Lieutenant-Governor of this "Ceded Province" as it was then called, and it was then looked upon as our frontier towards Afghanistan. Possibly some politicians to-day may wish this had remained our Scientific Frontier! Indeed, Sir John Craig was ordered to mobilize against an expected invasion of Afghans under Zaman Shah, and he assembled a large force at Anupshar. Thus the red tint was extended to the north as represented on the map. But between these red tinted territories—north-east and south—extended a huge expanse, comprising the richest provinces and the most famous cities of India. This territory is roughly about three times the size of France. It extended from Ferozepore to Goa' and from the Gulf of Cambay right across the peninsula nearly to the Sunderbunds of Calcutta. Now this vast area was under the misrule of the Mahratta Confederacy. Its great Chiefs were not men of ancient lineage like the Chiefs of Rajputana, but successful freebooters. Holkar, whose capital was Indore, was the most conspicuous of these freebooters. Scindia was another. The Rajah of Berar, called the Bhonsla, was much the same. The Gaikwar of Baroda was the only respectable man amongst them, and their nominal Chief, the Peshwah, was but a weakling now under Scindia's influence—now under that of Holkar. Each of these Chiefs maintained huge armies at the expense of their neighbours. This was especially the case with Holkar, who, whenever his men were mutinous on account of arrears of pay, settled the matter by a plundering expedition into the Nizam's territory or into Raj-

putana or into Scindia's possessions. On these occasions his troops, mostly cavalry, proved themselves great adepts at finding treasure or grain. They tortured the unfortunate villagers. Toasting a buniah over an "angiti" was an "atrocitiy" that was frequently resorted to.

As long as these Chiefs amused themselves by fighting and spoiling each other, so long as they did nothing actively against the Company's territory or against its ally the Nizam, so long would Marquis Wellesley have been content to "care for none of these things." But again the spectre of French supremacy roused his ire and determined him to break up the power of the Confederacy. So early as September 1801, two years before hostilities commenced, we find Colonel Arthur Wellesley submitting a scheme of campaign against the Mahrattas. This shews the war was long looked upon as inevitable, and the reasons were these: Since 1783 French influence had been gradually increasing in Hindustan Proper. The Chiefs of the Mahratta Confederacy—especially Scindia, the Bhonsla, and Holkar—vied with each other in attempts to improve their armies on the European model. They officered their troops with English, Scotch, French, and German soldiers of fortune. The French, especially owing to the organizing genius of De Boigne, obtained a marked ascendancy in the armies of Scindia. That remarkable man, after rising in the Russian Army to the rank of Major, eventually served as a Subaltern in the 6th Regiment of Madras Native Infantry. This appointment he after a while threw up, and with Warren Hastings' permission attempted to penetrate into Russia, starting from Calcutta; but eventually De Boigne was obliged to stop at Dehli, his cash and letters of credit and recommendation having been stolen. He took service with Mahaji Rao Scindia (the father of Dowlat Rao Scindia, who was the Chief our story has to do with). Under the former Chief he raised a splendid body of infantry and artillery, that originally numbering but two battalions in 1783, was increased to no less than 58 battalions in 1803, together with over 400 guns. De Boigne obtained from Scindia the cession of the Doab between the Ganges and the Jumna,—a tract partly conterminous with our frontier. His administration of these districts was so admirably organised that, when our Rule was introduced in these districts in the autumn of 1803, our civil officers found the system, founded by De Boigne, worked so well that it has formed the basis of our revenue and civil administration to the present time. De Boigne left India in 1797 with a fortune of forty lakhs of rupees. This is an enormous sum, but many of the military adventurers of that time returned home with much more. India at this epoch teemed with adventurers. The famous George Thomas, who ruled at Hansi and who was the terror of Patiala and Jhind, had only just passed away in August 1802. Amongst other Englishmen, whose names have come down to us, Sutherland and Brownrig, called by their native soldiers respectively "Sutluj Sahib" and "Brandy Sahib," came to the front as Scindia's Brigadiers. But on Perron (who amassed a fortune of about two millions sterling in nine years) devolved the supreme command in succession to De Boigne. Under Perron, commanding his formidable artillery and 58 trained battalions, were 40 English officers and 260 foreigners mostly French.

We must remember that the English had been carrying on since 1793 a desperate struggle with France, and that peace had only just been concluded in March of 1802 at Amiens—an event not known in India until the 14th June following. Marquis Wellesley acted under the feeling, fully shared by his countrymen, of a lively dread of the power and hostile intentions of General Bonaparte, and with reason. We must bear in mind that the France of 1800, as compared to ourselves at the same date, is not like the France of to-day. A century ago the French numbered 27½ millions, whereas we had but 15 millions in the British islands. Besides the disadvantage of this disproportion in numbers, we were on no very good terms with what remained of our American colonies, and there was active rebellion in Ireland and much just discontent amongst the masses in England. What Marquis Wellesley dreaded was that, during the interval of this patched-up peace, as the Foreign Office unaccountably had restored Pondicherry and other possessions to France, it was perfectly possible that Perron's brigades might be largely reinforced by trained and experienced French officers. Perron held sway over what is officially called the "French State" extending from Bikanir to Alighar and from Saharanpur to Gwalior, and collected a revenue of over two millions sterling. He had, moreover, custody of the old Mogal Emperor, Shah Allum, then 83 years of age. This unfortunate Prince had had his eyes put out, when about 60 years' old, by a brutal miscreant called Gholam Kadr. Perron used the Emperor's name as the sanction for his rule, and urged that unfortunate monarch to invoke the aid of France to regain the former glories of the house of Timour. Marquis Wellesley, from intercepted correspondence, was quite aware of these intrigues, and all his policy, with the Mahrattas, was based upon rendering it impossible for the French to do us harm, by assisting them to combine against us. He perceived the weakness of our position lay in the extent of coast line not in our hands, and he determined that at all events this defect should be remedied on the first opportunity.

The question, whether Lord Wellesley was justified in his apprehensions regarding the extent and character of French influence in Hindustan, has always formed the subject of discussion.

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Thus 115,000 horsemen were to invade our possessions and those of our ally the Nizam, and our retaliatory movements were to be opposed by 80,000 infantry and over 800 guns.

Wellesley knew that the battalions opposed to him were almost as good infantry as the Company's native troops. They were armed with muskets of European make or manufactured at Agra, where also a Scotch officer called Sangster cast capital bronze guns. These, when captured eventually by us, were so good that they were at once passed into our service. Their European officers were, per battalion, just as numerous as those with our native troops, who in those days had from 4 to 5 British officers per battalion. I don't think, under these circumstances, the danger was as conjectural as James Mill makes out, or that the Governor General was wrong in writing "that no instrument of destruction more judiciously placed, than was the French State, to strike at the heart of the British Empire in India, could suggest itself to the vindictive hands of the First Consul of France."

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To do this he had the following disposable troops:—

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He had also 17 regiments of Indian Cavalry, or 10,200 sabres, all told, and his European force was about 3,600 European artillerymen, 3,600 British Cavalry, and about 16,000 British Infantry. Summarizing, the Governor General had 23,600 British and 130,000 Native soldiers. Besides these regular troops, there were several Sebundy battalions under the Judge and Magistrates of districts, and with one or two English military officers. They assisted in maintaining order and facilitating the collection of the revenue by the Receivers, as the Collectors were termed in those days. These Sebundies must, to a certain extent, have resembled the frontier militia who were, in my younger days, called "Catch'em alive'o's."

Then there were other corps such as "The Marine Battalion," "The Corps of Hill Rangers," "The Calcutta European Militia," and "The Calcutta Native Militia," "The Bengal Volunteers" (Natives who were willing to serve beyond the sea), and a mounted corps called "The Hindustani Independent Regiment" whose sowars were enlisted for 20 Sonat Rupees on the zillahdari system. Consequently, with all these multifarious duties, the Governor General found he could put into the field for offensive purposes against the Mahrattas but 54,918 out of his army of 153,600. If hostilities could be avoided by diplomacy and the Confederation broken up by that means, so much the better; but if war did break out, the Marquis had his plans of mobilization as well as Perron. He had devised a scheme at once—bold, comprehensive, and judicious. He proposed to attack the Mahrattas in the South with the Madras Army, and the Haidarabad subsidiary troops and other troops to be furnished by the Nizam. With the Bombay Army he would secure the Western coast to the deserts of Sind, and with a mixed force of Bengal and Madras troops, acting from Midnapore and from the coast, he would seize Kuttuk, and join up the Madras coast line with that of Bengal.

From Mirzapur Berar was to be kept in check. The main army of Bengal would advance into the Doab and Bundelkund, take Dehli, Agra, and Gwalior, and rescue the old Mogal Emperor, Shah Allum, from the thralldom in which he was held by Perron, acting on Scindia's orders.

As the belief gradually strengthened that the Peace of Amiens (known in India in June 1802) was but a truce, Wellesley's anxieties increased, especially as he learnt from England that De Boigne, who had so lately organised Scindia's troops, was hourly closeted with Bonaparte at St. Cloud. This, however, is denied by his grandson, the Comte De Boigne, who says his grandfather, being a Royalist, lived in strict seclusion during the Napoleonic era. Be this as it may, the Governor General believed in the statement.

But his fears that a Mahratta combination against us would become a reality were dissipated by the rupture that took place between Holkar and Scindia for the possession of the person of the Peshwah. Holkar fought a great battle at Puna against the united forces of Scindia and the Peshwah on 25th October 1802 and utterly defeated them.

The Peshwah fled for protection to the English and was transported in an English ship to Bassein. Scindia urged the English to

restore the Peshwah, and the latter expressed his willingness to conclude a subsidiary treaty with us, which we had frequently urged him to do through that eminent Political Officer, Barry Close. A treaty was eventually signed at Bassein between the Peshwah and the English on the last day of the year 1802. Marquis Wellesley describes the purpose of this treaty thus: "It is the principal object of the Treaty of Bassein to prevent the sovereign power of the Mahratta States or the power of any great branch of the Mahratta Empire from passing into the hands of the French."

The English undertook to restore the Peshwah to his throne at Puna, and drive Holkar out of the Peshwah's dominions. Thus the long expected war began; and the Madras Army in January and February 1803 was mobilised and took post on our southern frontier at Hurrihur on the Toongabutra River.

Before relating the details of the campaign of 1803, I think it may interest you if I very briefly glance at the constitution of our army in India at the date in question. All the Native troops, the Artillery, and three battalions of Europeans belonged to the Honourable Company. All the European Cavalry, *viz.*, five regiments of Dragoons, and 16 regiments of the Line, belonged to King George III. The Commander-in-Chief in Bengal was Lieutenant-General Gerald Lake, who succeeded Sir Alured Clarke in 1801. He was then 57 years old; he had served in America and in the abortive campaign in the Low Countries under the Duke of York, and had had the singular misfortune to be thoroughly beaten at Castlebar by the French! Under him was an Adjutant-General for the King's troops and another for the Company's, also a Quarter Master General for the King's troops and another for the Company's, and this dual system pervaded all Divisions of the Army. We are to-day so accustomed to the routine that supplies this country with a continual stream of highly educated and scientifically trained officers to administer and to defend our Indian possessions that it is hard for us to imagine the casual manner in which these wants were supplied at the time we are considering, for neither Haileybury nor Addiscombe had yet been established.

The Writers or Civilians were youths of from 14 to 16 years of age, nominated to these important posts by the Directors of the East India Company. The same system prevailed for the cadets that were sent out to this country for the cavalry and infantry of the Company's armies. They came out, at their own expense, on board *Indiamen* that sailed in fleets 2 or 3 times yearly for mutual protection against the French. I may mention that as I was one of the last of the Honourable East India Company's officers, I also had the honour and privilege of paying for my passage when I first came out to India, although I was then a commissioned officer of over 18 months' standing. When these cadets landed in Calcutta, they were at once packed off in Palkis to the Military College at Baraset. This institution was founded at the end of the last century for the purpose of instructing newly arrived cadets in drill and Hindustani previous to their being appointed to regiments. There were barracks at this village which is about 16 miles from Calcutta, in which about 200 youths, fresh

from England, were housed. As the Superintending Officers' bungalows were about a mile distant from the barracks, we can readily imagine that these youths ran riot, and that the institution did them more harm than good, and on that account it was abolished in 1809, and Addiscombe near Croydon took its place.

Marquis Wellesley made a great point of all freshly arrived youths from home, whether for the civil service or for military employment, acquiring, as quickly as possible, a knowledge of the native languages.

On his own responsibility he instituted the famous College at Fort William where Arabic, Sanskrit, Persian, and Hindustani were taught and where young Writers had to study for two years before they entered upon their duties. He took a strong personal interest in the examinations held both at the College of Fort William and at Baraset, and it is related that, in company with two High Court Judges, he was present in March 1803 at the Examination in Hindustani of the cadets at Baraset, having previously breakfasted with them. Successful cadets were at once posted to regiments of Cavalry or Infantry, and they also were presented with a gift of Rs. 500, or about £62 (for in those days the rupee was worth 2s. 6d.). Each cadet also received a regulation sword.

Cadets for the Company's Artillery and Engineers went to Woolwich until 1811. After that date they were sent to Addiscombe for their Military Education.

The officers in the King's service in India were mostly those who had purchased their commissions. Boys of 9 held commissions, although they did not join their corps until about 14 or 15 years of age. Officers in the Household Troops had the privilege of holding army rank far above their regimental ranks; thus a Captain in the Guards ranked as a Lieutenant-Colonel in the army. Owing to these regulations, officers in the King's service in India, holding equal rank to the Company's officers, were generally much younger men—a state of things productive of a good deal of jealousy and unpleasant feeling. Some of us grumble a good deal about pay and prospects now-a-days; but depend upon it, we are far more fairly treated and paid than a century ago: for instance, on service an officer drew no ration for his horse; he had to make his own arrangements, although gram might be selling at 2 or 3 seers per rupee. Captain Blakiston of the Madras Engineers says, in his interesting memoirs, that more than half his pay went to feeding his horse! An officer also had different rates of batta at different stations; and, moreover, he was liable to be paid in five different currencies.

Then you must remember that life in India, even at the great cantonments like Cawnpur and Futhghur, judged by our present standard, was like being buried alive. No telegrams, no daily paper, an occasional post from England every month or six weeks, containing news six months old, and, except at the presidency towns, hardly any ladies' society. No wonder, the private life of our predecessors differed considerably from ours; but we must not judge them by our standard,

but with that of their compatriots at Home, then things will appear in proper proportion. At Home a century ago our penal laws were brutal and cruel, society drank hard, was continually fighting duels, patronised the prize ring, bull and bear baiting and cock fighting. We flogged our sailors and soldiers unmercifully; we made no provision (as a matter of regulation) for the widows and orphans of our officers and soldiers. Anything done either by the King's or the Company's Government in that way was obtained only through interest. We must remember also that the private life of eminent men in England set a very bad moral example, judged by the sentiments of our day. The Zenanah system of our predecessors was but a copy, adapted to the circumstances of life in India, of what went on in England during the Georgian Period. If then you compare the manners and morals of our predecessors in India with that of their contemporaries in England, they are not unfavourable. It is true, they did smoke Hookahs, and they were carried about in Palkis and drank, perhaps, to excess of (to quote Thorn) "the exhilarating wine of Shiraz, the ruby Carbonelle and the humble Port." What of that? But as regards the military qualifications of our predecessors in India, this is what an officer says who served in the Mahratta War, in Java, and throughout the greater part of the Peninsular War: "I must also say of the officers of the Indian Army generally, whether of the King's or Company's service, that in no part of the world have I witnessed so much zeal in their professional duties as is displayed by them." Again, he writes: "I must also say of the European soldiers in India that they have more dash in them than their countrymen display in Europe." This is valuable evidence from an officer who was not only present at Assaye and Argaum, but at Vittoria, St. Sebastian, and Nivelle.

Our infantry were armed with flintlocks, having a range of about 300 yards. Our guns were 12 prs. and 6 prs. with a range of about 600 to 1,000 yards; grape, common spherical shell, and solid spherical shot formed the list of projectiles. In addition to these, the Mahrattas made use of chain shot which they called "chadar;" that is, a chain like a thick dog-chain with a ball at each end rolled up and tied to fit the bore of the gun using it. On leaving the muzzle it spread out, and at close quarters must have been very destructive.

As regards the uniform worn, I can only hazard conjectures from an examination of such prints relating to the end of last and beginning of this century as I have been able to refer to; but I am convinced the idea I had, before I came to study this period, that our officers and men wore leather stocks in those early Indian campaigns, is quite erroneous. The coat was open at the throat which seems to have been protected by a black silk handkerchief for the officers, and by some sort of neckcloth for the men. This is very different from the abominable leather stock that was afterwards introduced and that survived until swept away, with many other military atrocities, by that wholesome tonic—The Crimean War.

The men wore red coats that buttoned over a waistcoat with knee breeches and gaiters. In the Illustrated papers of the 8th July of the current year (1899) you will find excellent examples of the uniform worn by the British troops at the beginning of this century.



the necessary amount. The agreement so made was called a subsidiary treaty, and here let me point out that the word *subsidiary* in diplomacy does not mean to imply inferiority or being supplementary which is the usual acceptance of the term, but it means simply relating to a subsidy of money. The boy who thus brought forth was called the "Haidarabad Subsidiary Force" and exists to this day. This force must not be confounded with the Haidarabad "Contingent" which was organised at a later date.

Marquis Wellesley followed up this step towards excluding French influence by attacking, under ample provocation, Tipu Sultan in the capital of Seringapatam with the result that we all know. His brother, Colonel Arthur Wellesley, who preceded him in India by little more than a year, was transferred from commanding the "Haidarabad Subsidiary Force" to command a brigade before Seringapatam, and was succeeded in the command of the "Haidarabad Subsidiary Force" by the famous Colonel Stevenson who was subsequently Arthur Wellesley's right-hand man in his memorable campaign against the Marhatta Confederacy. The third step taken by Marquis Wellesley to consolidate our power in Southern India was to annex the Nizam's Arcot's territories for taxation. We can now turn to the map and see how this masterful politician lifted the southern portion of the peninsula before he turned his attention to our northern possessions. The map shows the extent of the Madras Presidency at the beginning of this century, and it remains much the same now.

In Bengal the Governor-General on very cogent grounds, which it is not here necessary to detail, found himself compelled to accept the Nizam's War of Omra, the cession of Rohilshind and a part of the Lucknow Empire to his brother Henry as Lieutenant-Governor of the "Ceded Province" as it was then called, and it was thereupon an earnest effort towards Afghanistan. Peshwa's movement was a very wise one, and this had remained our Scientific Frontier. The Duke of Wellington was ordered to mobilize against the Afghans under Zaman Shah, and he assembled a large force at Agra. Thus the red dot was extended to the north as represented on the map. But between these red dotted territories—each east and south extended along a province, comprising the red dot provinces and territories—there was a small gap. The territory is roughly a triangle from the Gulf of Cambay right across the peninsula nearly to the Sunderbans of Calcutta. Now this vast area was under the misrule of the Marhatta Confederacy. Its great Chiefs were not men of a certain aristocratic Calcutta Rajputry, but successful herd-owners. The Marhatta Confederacy was a tribe, was the first component of these three States. It was a tribe. The Rajput of the Raj, called the Marhatta, was a man among men. The Governor of Baroda was the only responsible man among them, and their nominal Chief, the Peshwa, was but a weak puppet under the Marhatta's influence—now under that of the British. The Marhatta Confederacy had huge armies at the expense of the Marhatta States. This was the case with the Marhatta, who whenever his army was not engaged in a fight of affairs of pay, settled the matter by a peaceful agreement, and put the Marhatta's territory on into Raj-

putana or into Scindia's possessions. On these occasions his troops, mostly cavalry, proved themselves great adepts at finding treasure or grain. They tortured the unfortunate villagers. Toasting a buntia over an "angiti" was an "atrociti" that was frequently resorted to.

As long as these Chiefs amused themselves by fighting and spoiling each other, so long as they did nothing actively against the Company's territory or against its ally the Nizam, so long would Marquis Wellesley have been content to "care for none of these things." But again the spectre of French supremacy roused his ire and determined him to break up the power of the Confederacy. So early as September 1801, two years before hostilities commenced, we find Colonel Arthur Wellesley submitting a scheme of campaign against the Mahrattas. This shows the war was long looked upon as inevitable, and the reasons were these: Since 1783 French influence had been gradually increasing in Hindustan Proper. The Chiefs of the Mahratta Confederacy—especially Scindia, the Bhonsla, and Holkar—vied with each other in attempts to improve their armies on the European model. They officered their troops with English, Scotch, French, and German soldiers of fortune. The French, especially owing to the organizing genius of De Boigne, obtained a marked ascendancy in the armies of Scindia. That remarkable man, after rising in the Russian Army to the rank of Major, eventually served as a Subaltern in the 6th Regiment of Madras Native Infantry. This appointment he after a while threw up, and with Warren Hastings' permission attempted to penetrate into Russia, starting from Calcutta; but eventually De Boigne was obliged to stop at Dehli, his cash and letters of credit and recommendation having been stolen. He took service with Mahdi Rao Semlia (the father of Dowlat Rao Scindia, who was the Chief our story has to do with). Under the former Chief he raised a splendid body of infantry and artillery, that originally numbering but two battalions in 1783, was increased to no less than 58 battalions in 1803, together with over 400 guns. De Boigne obtained from Scindia the cession of the Doab between the Ganges and the Jumna,—a tract partly conterminous with our frontier. His administration of these districts was so admirably organised that, when our Rule was introduced in these districts in the autumn of 1803, our civil officers found the system, founded by De Boigne, worked so well that it has formed the basis of our revenue and civil administration to the present time. De Boigne left India in 1797 with a fortune of forty lakhs of rupees. This is an enormous sum, but many of the military adventurers of that time returned home with much more. India at this epoch teemed with adventurers. The famous George Thomas, who ruled at Hansi and who was the terror of Patiala and Jhind, had only just passed away in August 1802. Amongst other Englishmen, whose names have come down to us, Sutherland and Brownrig, called by their native soldiers respectively "Satluj Sahib" and "Brandy Sahib," came to the front as Scindia's Brigadiers. But on Perron (who amassed a fortune of about two millions sterling in nine years) devolved the supreme command in succession to De Boigne. Under Perron, commanding his formidable artillery and 58 trained battalions, were 40 English officers and 260 foreigners mostly French.

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But his fears that a Mahatta coalition against us would become a reality were justified by the rupture that took place between Hukar and Simla after the possession of the person of the Peshwah. Hukar had taken a great battle at Panaji against the united forces of Simla and the Peshwah on 25th October 1802 and utterly defeated them.

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restore the Peshwah, and the latter expressed his willingness to conclude a subsidiary treaty with us, which we had frequently urged him to do through that eminent Political Officer, Barry Close. A treaty was eventually signed at Bassein between the Peshwah and the English on the last day of the year 1802. Marquis Wellesley describes the purpose of this treaty thus: "It is the principal object of the Treaty of Bassein to prevent the sovereign power of the Mahratta States or the power of any great branch of the Mahratta Empire from passing into the hands of the French."

The English undertook to restore the Peshwah to his throne at Puna, and drive Holkar out of the Peshwah's dominions. Thus the long expected war began; and the Madras Army in January and February 1803 was mobilised and took post on our southern frontier at Hurrihur on the Teongabutra River.

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from England, were housed. As the Superintending Officers' Quarters were about a mile distant from the barracks, we can readily imagine that these youths ran riot, and that the institution did them more harm than good, and on that account it was abolished in 1809, and Ashurst Combe near Croydon took its place.

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As regards the uniform worn, I can only hazard conjectures from an examination of such prints relating to the end of last and beginning of this century as I have been able to refer to; but I am convinced the idea I had, before I came to study this period, that our officers and men wore leather stocks in those early Indian campaigns, is quite erroneous. The coat was open at the throat which seems to have been protected by a black silk handkerchief for the officers, and by some sort of neckcloth for the men. This is very different from the abominable leather stock that was afterwards introduced and that survived until swept away, with many other military atrocities, by that wholesome tonic—The Crimean War.

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He had 100 17 regiments of Indian Cavalry, or 10,200 soldiers and 11, and his European force was about 3,500 European artillery and 2,600 British Cavalry, and about 16,000 British Infantry. Since 1801, the Governor General had 22,600 British and 13,000 Native soldiers. Besides these regular troops, there were several Sikh and battalions under the Jukana and Magistrates of districts, and with one or two British military officers. They were used in maintaining order and in enforcing the collection of the revenue by the Revenue, as the Collectors were termed in those days. These Sikh and Sindh, to a certain extent, have resembled the frontier militia who were, in my young days, called "Catchem alive's."

Then there were other corps such as "The Marine Battalion," "The Corps of Hill Rifles," "The Calcutta European Militia," and "The Calcutta Native Militia," "The Local Volunteers" (Natives) who were willing to serve beyond the sea, and a mounted corps called "The Hindustan Independent Regiment" whose sowars were enlisted for 20 Sansit Ruprees on the zildchare system. Consequently, with all these multifarious duties, the Governor General found he could put no field force for offensive purposes against the Mahrattas but 4,418 of his army of 15,360. If this force could be avoided by diplomacy, and if the Government could be kept up by their means, so much the better. But if war broke out, the Mahrattas had his plans of mobilization as well as Peshwa. He had 15,000 men at once—both, comprehensive, and bold. The plan was to attack the Mahrattas in the South with the Mahratta Army, and the Hindustan soldiers, and other troops to be furnished by the Nizam. With this force, they would secure the Western coast to the borders of Sind, and would have a mixed force of British and Mahratta troops, acting from Mombasa and from the coast, they would seize Kuttk, and join up the Mahratta coast line with that of British.

From Mizoor Por was to be kept in check. The main army of Peshwa would advance into the Deccan, and take Delhi, Agra, and Oudh, and then the Mahratta Emperor, Shah Asaf, from the throne in which he was held by Perron, acting on Simla's orders.

As the British gradually strengthened, the Peace of Amoy (known in India in 1801) was cut a free, Wellesley's anxiety increased, especially as he learnt from a friend that De Buge, who had lately arrived in Simla, was warmly disposed towards the Mahratta. At St. George's, this was a great blow to the Governor General, who says his grandfather, being a Royalist, was in strict seclusion during the Revolution. But as it may, the Governor General believed in the strength of the Mahratta.

But his fears that a Mahratta coalition against us would become a reality were dissipated by the rupture that took place between Hukar and Simla after the possession of the person of the Peshwa. Hukar had a great battle at Puna against the united forces of Simla and the Peshwa on 23rd October 1802 and utterly defeated them.

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The uniform of the Company's Bengal Native Infantry was as is here portrayed.\* It is an enlarged copy from a work by a Captain James, published in Calcutta in 1811. The sepoy is in the act of "Priming" and shaking some powder into the pan. The words of command in those days for the Platoon exercise were not less than 11 ! Thus—

Load.	Return Ramrods.
Handle Cartridge.	Shoulder Arms.
Prime.	Make Ready.
'Bout.	Present.
Draw Ramrods.	Fire.
Ram down Cartridge.	

All this in 23 motions. Think of this cumbersome method as compared with the 7 compact motions now required.

I think pig-tails had gone out, at least General Wellesley is not represented as wearing one. Some of the older officers in the Company's service did, witness the following description of the appearance of a celebrated Political Officer—"Little King Collins" as he was nicknamed. Colonel Collins was the Resident at Scindia's Court and a great Bahadur. Not content with the escort allowed him of a battalion of infantry and a troop of cavalry, he had a battery also for purposes of saluting. When he met General Wellesley at Aurungabad, the meeting is thus described :—

"In front of a noble suite of tents, which might have served for the grand Mogal, we were received by an insignificant, little, old looking man with bushy eyebrows and black piercing eyes, dressed in an old fashioned military coat, white breeches, sky-blue stockings, and large glaring buckles to his shoes, having his highly powdered wig, from which depended a pig-tail of no ordinary dimension, surmounted by a small round black silk hat ornamented by a single black ostrich feather and looking altogether not unlike a monkey dressed up for Bartholemew Fair."

Our dragoons wore brass helmets and the newly raised horse artillery, brass helmets with red horse-hair tails like the Bandsmen of French Dragoon regiments wear to this day. In December and January 1802-03 a Cavalry Camp of Exercise was held at Kanuj, so we must not imagine this practice is a new idea of our own day. At this Camp of Exercise the 8th, 27th and 29th Dragoons and five Bengal Native Cavalry regiments were present under the command of Colonel St. Leger. With the cavalry was tried, as an experiment, the first troop of Horse Artillery ever raised in the British Army. Two 6-pr. guns were attached, in manœuvres, to each cavalry regiment and the results were so satisfactory that the cavalry in Madras was ordered to be accompanied with horséd guns. In subsequent operations against the Mahrattas these "galloper guns," as they were called, proved of very great value. It was, I believe, Colonel Horsford, Bengal Artillery, that really was the originator of our Horse Artillery. Field Batteries were drawn by bullocks ; these could move at a trot over

\* Not reproduced for the Journal.

considerable distances. They were not horsed until 1818. Our preliminary remarks, before we detail the military operations against the Mahrattas, are not yet finished, for I must add a word about Rations, and Transport as well as about Intelligence.

The native troops on service were given  $\frac{1}{4}$  seer of rice daily, and that was all. The Europeans had rations of biscuit, salt beef, and occasionally mutton and always arrack. They had two tots a day—one immediately on arrival at the camping-ground and another in the evening. General Wellesley's anxiety that his Europeans should always have their arrack is most marked in the Wellington Despatches. The arrack was, I presume, ordinary country spirit—a most vile decoction. But sanitary science was utterly unknown a century ago, and whole European regiments disappeared under the influence of bad quarters, intemperance, and the sun. The survivors were those who were arrack-proof within and sun-proof without. The Medical Department was undermanned, so much so that, after Assaye, some of the wounded had to wait a whole week after that battle before their wounds were dressed. Medical science was then only just emerging from the veriest empiricism. In the military hospitals—what with no anæsthetics, no anti-septic treatment, nor careful nursing—the scenes must have been awful. Truly, the modern soldier owes much to Science.

The Commissariat was differently organised to what it now is. There was a Commissary of Grain and a Commissary of Bazaars and Supplies. These officers had charge of the hired and contractors' bullocks. Almost all the transport of the army consisted of bullocks. The Bandjarrah's bullocks especially were indispensable. These men had the carrying trade of India practically in their hands. They were armed with shields and swords and drove their immense herds of thousands of bullocks from district to district, trading chiefly in grain. With the advent of metalled roads, which were not commenced in India until 1843, and the consequent creation of the cheaper cart traffic, these Bandjarrahs, so useful to the armies of India in their day, have in great part disappeared. Officers' and men's tents were carried on bullocks, camels, and elephants. Each subaltern had a marquee 10-foot square; a captain a larger one, and a field officer a still bigger tent. Each company of Europeans had six large bell tents. To pitch his tent and attend to his horses and to his other wants, a subaltern had 10 servants, a captain 20, a field officer 30 or more. The consequence was that, when the army moved both in the South as well as in the North, the number of followers to fighting men was as 10 to 1. The plan of march General Lake adopted was to have his artillery and ordnance carts on the road; his baggage and the huge bazars, that accompanied all armies in those days, on the right flank of the road, and beyond them his cavalry, whilst on the reverse flank marched the infantry. The advanced guard consisted of all soldiers on the roster for guard and outpost duty for that day, and the rear guard consisted of all those that had been on such duty the day previous. The Europeans had their packs carried for them; but the natives carried their own packs. Now in Scindia's armies, at all events in Du Drenac's brigades, that Lake defeated at Laswari, the native soldiers had their packs carried for them—a concession Lake strongly urged might be imitated in

our army, as conducive to mobility. For fuller detail about transport and marches I would refer my readers to the following contemporary writers:—

Major Thorn, who served under Lake, wrote in 1818 a Memoir of the Mahratta War.

Captain Blakiston, who wrote in 1829, served under General Wellesley in the Mahratta War and gives a narrative of the events of that war in a book entitled "Twelve Years' Military Adventure."

Major Dirom, who published "A Narrative of the Campaign in India" in 1792; and, lastly—

Lieutenant Moor published in 1794 "A Narrative of Military Events in Southern India in 1790."

All these four authors give graphic descriptions of the transport and order of march of our Indian Armies a century ago; and as these works are rare and not easily procurable, I have made extracts of these descriptions, which, you will find at the end of this lecture.

Lastly, a word about the Intelligence Department. It does not appear that either Lake or Wellesley employed their cavalry as scouts as is done to-day in Europe and in India. Wellesley says: "The information which we obtain regarding the position of an enemy, whom we intend to attack, is generally very imperfect. We cannot send our natives in the Company's service, who, from long habit, might be able to give an accurate account, because, being inhabitants of the Carnatic or Mysore, they are as well known in this part of the country as if they were Europeans; and we cannot view the positions ourselves till we bring up the main force of our armies, because the enemy are always surrounded by immense bodies of horse. The consequence is we are obliged to employ as 'Hirkarehs' the natives of the country and trust to their reports."

These Hirkarehs were also employed in carrying despatches and were generally mounted on fleet camels. But where great secrecy was required, footmen were employed disguised as peasants or fakirs; and these had the most ingenious modes of concealing papers with which they were entrusted. We learn from the Wellington Despatches how General Wellesley constantly received Hirkarehs from Holkar's and Scindia's Camp. Hirkarehs were sharp enough to intercept letters, as was done by General Perron's Hirkarehs, who intercepted correspondence that determined that officer to forsake Scindia.

I fancy, in short, the intelligence was managed in India in Wellesley's time much in the same manner as it has been conducted in Egypt lately.

I will now endeavour, in the short space of time at my disposal briefly to notice the military movements that took place immediately it was determined to replace the Peshwah on his throne at Puna. A force of 20,000 men, under Lieutenant-General Stuart, the Commander-in-Chief at Madras, assembled at Harrihur on the Toongabudra River. A portion of this force, about 8,000 men, destined

to occupy Puna, crossed this river on the 12th March 1803. It was under command of Major-General Wellesley who had been selected, because he knew the country and was personally acquainted and on friendly terms with the Southern Mahratta Chiefs, through whose country the march of this detachment lay on its route to Puna.

At the same time Colonel Stevenson from Haidarabad moved on Perinda westwards with the intention of effecting a junction with General Wellesley and then advancing together on Puna. Wellesley, after crossing 5 rivers, at all of which crossings he left strong guards and collected boats, to assure his communications during the rains when the rivers were full, joined Stevenson on 15th April at Akluj. During his progress from the south he had increased his force of 8,000 European and Company's troops by the contingents of horse of the various chieftains who had joined him, so that Wellesley at Akluj had a force of about 11,400 and Stevenson of about 23,000. As these forces advanced, Holkar's forces retired. On that account, and to facilitate foraging, General Wellesley determined to separate and let Stevenson advance along the Bima and then cross over to the Sina and echelon himself on that river south of Ahmednagar, Holkar's great fortress, whilst he advanced on Puna, which he reached on 20th April 1803. Troops from Bombay, accompanying the Peshwah, started about 25th April and effected a junction with Wellesley about the end of the month.

In the beginning of May the military situation was as follows:—Stevenson spread himself out as far as the Godaveri and held Puttan, deriving his supplies from Haidarabad. Wellesley was concentrated at Puna, but had outposts towards Stevenson. He still derived his supplies from the South. For, although months before he had urged the Governor of Bombay, Mr. Duncan, to arrange to supply him, the moment he arrived at Puna, *via* Panwell from Bombay, he was disappointed. The Bombay Government utterly failed to realize their responsibilities, and, after six months' experience of the Bombay administration, this is what General Wellesley says—

There are two parties throughout the Bombay establishment, and these are—the Civil and Military services; and the latter are divided into two parties—those in the King's and those in the Company's service. The disputes of these parties are the sole business of every man under the Government of Bombay; and they are maintained by the system of encouragement given to correspondence, and the perpetual references to individuals by Government. In short, I see clearly that nothing can succeed with those people as it ought, and I wish to God that I had nothing to do with them.

How very different was the conspicuous aid afforded by the Government of Bombay, under the able administration of Sir Richard Temple, during the last Afghan War!

Wellesley, owing to these unfortunate shortcomings, addressed his brother, the Governor General, asking for full political and military powers for the operations in Gujerat, Bombay, and in the Peshwah's territory and the Nizam's frontier. These powers he did not receive until 18th July. It was a mistake not to have invested him with these powers the moment he crossed the Toongabudra. The



Peshwah arrived in Puna on the 13th May and was re-instated with great pomp. You will recollect I mentioned that Scindia had urged on the British the necessity of restoring the Peshwah to power. But now appeared that to which we are all accustomed to in India, namely, the treachery of the Mahratta character. Scindia, after his defeat by Holkar, had retired to Oujein, his capital; but now, whilst Holkar had left Puna and gone off to Chandore, Scindia crossed the Nerbudda and was at Eadlabad, purposing to come on to Puna. The Bhonsla, too, was at Omraoti. Both these Chieftains were accompanied with formidable forces, the combined numbers being 38,500 horse, 14,200 infantry, and over 200 guns.

The Government of India had expected that, on the restoration of the Peshwah, peace would ensue; but the attitude of Scindia and the Bhonsla shewed we might expect active opposition from these Chieftains, and possibly Holkar might join them. Months passed in fruitless negotiation. Scindia insolently told Colonel Collins that after consulting with the Bhonsla, then he should tell him whether it was to be Peace or War! But it was not until General Wellesley received his full powers that these endless delays ceased. He then instructed Colonel Collins peremptorily to call upon Scindia to retire north of the Nerbudda and the Bhonsla on Nagpur or else to demand his passports. These two Chiefs with their armies were then at Mulkapur. The Peace of Amiens terminated on the 12th May 1803, the day before the Peshwah returned to Puna; but this news was not known in India until 6th September: in the interval there had arrived in June at Pondicherry a French ship to reinforce the garrison nominally; but really conveying a picked body of French officers to aid Perron's brigades. They expected to reach Dehli overland from the Kuttuk Coast; but Marquis Wellesley had had the foresight and the courage boldly to disregard the King's proclamation and the orders of the Foreign Office regarding the rendition of Pondicherry; and these French officers on their arrival found themselves blockaded by land and sea, and practically prisoners of war. Had they been able to join Perron and the Confederates in July, the fortune of the war might have been very different. As it was, General Stuart determined to diminish Wellesley's reserve at Mudgul by nearly half, in order to furnish an observation corps for Pondicherry. General Wellesley was not wholly idle; whilst the negotiations between Colonel Collins and the Chiefs were going on, he ordered Stevenson to Aurangabad. He himself advanced slowly on account of the rains and great losses in transport bullocks, and reached the Sina south of Ahmednagar. Early in August Collins left Scindia's camp at Jalgaun and active hostilities commenced. Colonel Murray was sent round to Surat to act with a force of 4,000 men against Scindia's Fort at Baroach in Gujerat. The Commander-in-Chief in Bengal was instructed to leave Cawnpore and advance on to the frontier opposite Koil, and Colonel Harcourt was entrusted with an expedition against the Bhonsla's territory on the Kuttuk Coast. General Wellesley advanced against Ahmednagar which he took on 12th August. I think it is marvellous this simultaneous advance of forces that were distributed so far apart, especially when we consider that there were no telegraphs.

in those days, and that it took 12 days from our Bengal frontier for a despatch to reach Calcutta ; from Puna, however, *via* Haidarabad the dāk was more expeditious, a week or so sufficed. We must now leave the Southern forces under Wellesley stretched out from Bombay to the Adjunta Pass, watching the marches and counter-marches of Scindia and the Bhonsla. These Chiefs wished to make a dash for Haidarabad ; but the presence of Wellesley, who had crossed the Godaveri, and Stevenson, with this flooded river behind them and the fords carefully guarded, caused the enemy to hesitate. Meanwhile, on 7th August, Lake had left Cawnpore and mustered his forces on 13th at Aroul not far from Kanuj. He had 8,500 men and about 100,000 followers and 73 guns. Although Perron, discovering Scindia's treachery, had practically resolved to forsake his cause and had already entered into negotiations with General Lake, he had nevertheless made certain dispositions of his forces, namely, at Alighar he had 3,000 infantry, at Dehli 14,000, and at Agra 11,000. Besides these, a force of 9,000 infantry was on its march from the South. He had also a force of 15,000 horse at Alighar, and his guns numbered over 515.

Our frontier cantonments were Amroa, Anupshar, Komona, Khasganj, Sasni, Shikohabad, and Etawah, and these were supported by the reserves at Fathghar and Cawnpore. The Ganges served as the great highway for supplies to Lord Lake's army and reminds one of the advantages Kitchener's army derived from the Nile. Further down the Ganges there were garrisons at Allahabad and Benares ; but these garrisons furnished reserves for independent expeditions into Bundelkhand and towards Berar. The only arsenal we had, other than Calcutta, was at Chunar, inconveniently far from the seat of war.

On reaching, after 14 marches, Secundrah on 26th August Lake received news that Colonel Collins had left Scindia's camp, and that hostilities had commenced. He then pushed on rapidly, being joined by General Ware from Fathghar, with a further brigade of troops, raising his total force to 10,500, and on 29th August he crossed the Mahratta frontier in sight of the minars of the masjid at Koil.

On that very day Marquis Wellesley issued a proclamation that had been prepared months before enjoining all British subjects as well as French and other Foreign European and American subjects to relinquish the service of Scindia and the Raja of Berar, *i.e.*, the Bhonsla, and assuring them the same salaries as they enjoyed under these Chiefs. I have been furnished by Mr. Charles Hill of the Record Department with a copy of this proclamation which you will find *in extenso* in the printed copy of this lecture. A facsimile copy lies on this Table. This politic act resulted in the relinquishment of his service by scores of Scindia's English and Foreign officers. His conduct towards them had, for some time, shewn he was suspicious of their allegiance.

Lake had a definite plan. The Governor General had urged him to concentrate a force between Agra and Koil and to advance a force from Etawah against Gwalior and also to advance against Saharanpur from Amroa.

Lake's plan differed ; it was to advance on Alighar and attack Perron ; 2ndly, to move then on Dehli ; 3rdly, *not* to attack *Gwalior* ; 4thly, to move on Saharanpur. This plan he carried out.

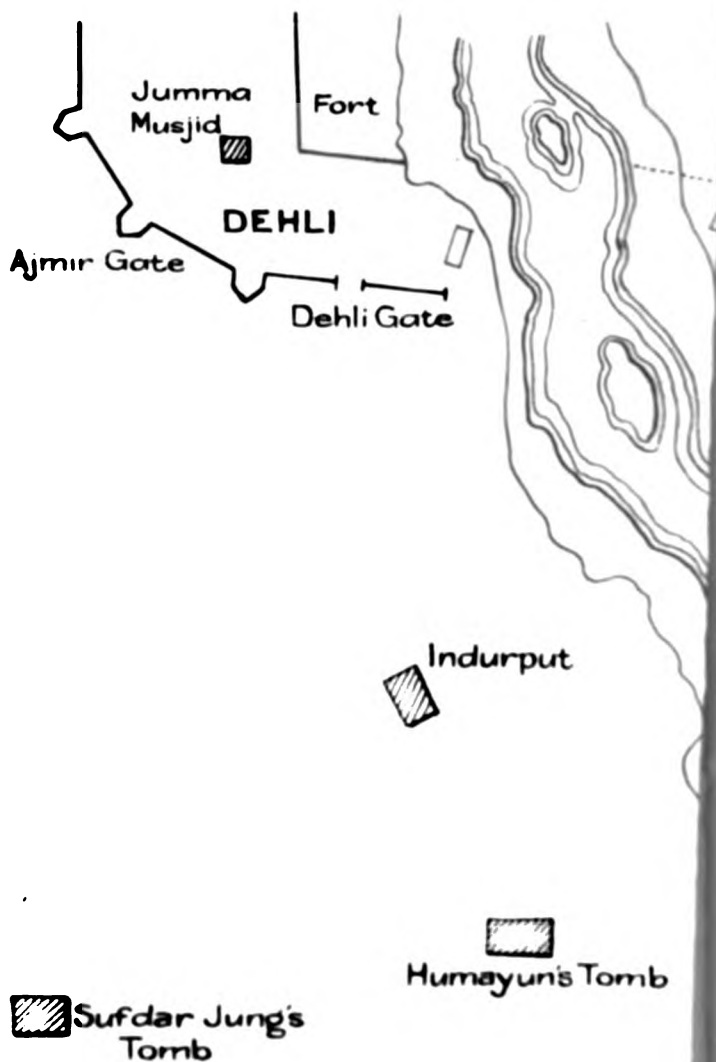
After engaging Perron's cavalry at Alighar and routing it, he attacked the very strong fort of Alighar, and by a happy *coup de main* succeeded in gaining possession of that fort. It was defended by broad and deep ditches ; but a causeway existed across which Pedron, the officer Perron had left in charge, had neglected to cut away. It was over this causeway that our troops entered. Captain Wood, C.R.E., and Colonel Horsford, C.R.A., advised an assault instead of a regular siege. I cannot help thinking, had Lake had to lay a regular siege to Alighar, subsequent disaster at Bhurtpur next year, where we lost 3,000 men in four unsuccessful assaults, would have been avoided ; but the capture of so strong a place as Alighar, with the loss of less than 300 men, made Lake impatient of the slow process of a regular siege ; and he attempted assault after assault at Bhurtpur on a fortress insufficiently reduced by engineering and artillery operations. The political consequences of the fall of Alighar on the 4th September were immense. The news flew to Dehli, 74 miles distant, in less than two days and all the country round. General Wellesley in the Deccan was apprised of it on 1st October, and Scindia and the Bhonsla must have known it then also ; but subsequent to their defeat at Assaye. It was known in Calcutta on the 15th September. Many wavering Chiefs now joined Lake, who at once marched direct on Dehli.

It should be noted these operations were carried out in September with the thermometer at 100° in the tents. The season, owing to failure of the monsoon, was favourable for military operations ; the country roads were dry. Indeed, it only rained seven times from Lake's crossing the frontier till 18th October when he took Agra ; but, on the other hand, grain increased in price rapidly. At Alighar, on the very day of taking the fortress, Lake despatched Colonel McCan with a brigade of cavalry in quest of a body of 5,000 Hindustani Horse under M. Fleury, who had successfully attacked a detachment of Company's troops, consisting of five companies of infantry and one gun, at Shikohabad. This brigade rode on along the left bank of the Jumna until the 17th September, when at Hyrathur it met another detachment from the main army, *viz.*, the 8th Dragoons and three battalions of Native Infantry.

Lake, in his despatches to the Governor General, says nothing about detaching four regiments of Cavalry (of which two were Bengal Cavalry) and three battalions of Infantry from his main body. Nor is there a word of this in Lake's General Orders.

I think it probable that Lake detached Colonel Vandeleur and H. M.'s 8th Dragoons and three battalions, Native Infantry, to cover his left flank whilst advancing on Dehli from a possible attack from Agra. The country he left in rear was in a disturbed state with numerous bands of predatory horse roaming about. Lake had at Alighar received Colonel Skinner's adhesion, and that famous cavalry officer was





## BATTLE OF DEHLI

1803.

1st Phase

Scale of Miles



entrusted, after the fall of Dehli, with maintaining communications between Aligarh and Dehli.

Thorn, the historian of Lake's Campaign, was one of the officers sent with McCan's cavalry brigade. Consequently, although he describes the battle of Dehli, he was not an eye-witness, and I am aware of no author who has written in that capacity, so that except Lake's official despatches, which are not very ample, we have no original material to work upon. Still we understand from them that he left Koil on the 7th. On the 8th he reached Kurjah, a strong fort he found deserted. Whilst on this march, at Somna he heard, to his great satisfaction, that Perron had reached Sasni as a refugee, and demanded a safe conduct to Calcutta. This was at once accorded. Lake had now with him but 4,500 of the 10,500 men he had at Koil. Garrisons at Aligarh and other posts and the large detachments above described reduced his force to that number. The details were—one brigade of three regiments of Cavalry, including the 29th Dragoons; nine battalions of Infantry, including the 76th Foot, and about 40 guns. With this force he pushed on rapidly towards Dehli and crossed the Hindon about 11 P.M. on 11th September, and encamped near the villages shewn on the map as Sudrpoor and Ghuri, which, I take it, are—the one, the village called Sudr ka Serai by Colonel Skinner, and the other, the Mud Fort, shewn in the plans of the battle of Dehli in Thorn's Narrative.

The troops had commenced cooking their dinners after a march of 18 miles that commenced at 3 A.M. Whilst thus engaged, the enemy's cavalry outposts attacked ours, and Lake, perceiving he had to do with more than predatory horse, ordered out his cavalry. Meanwhile let us see what the enemy had been doing. The 5,000 Hindustani Horse, that had attacked Shikohabad, retired on to Dehli, being chased by Colonel McCan's cavalry brigade. Their leader, Fleury, had deserted them and come over to the English. At Dehli it was believed Perron had deserted Scindia's cause and the 18 trained battalions there elected Louis Bourquain as their Chief; but as he proposed to retreat to Hansi, they deposed him and chose Surwar Khan as their Commander. By his orders on the 9th, that is, four days after the news of the fall of Aligarh, two brigades had crossed over the Jumna by the Patbarpur Ghât by the ferry boats. He and Louis Bourquain, who seems to have come to the front again as Commander, had, by the 11th, 12 battalions and 5,000 cavalry, with 70 guns, occupying a slightly raised position extending between two swamps, having the village of Patbarpur in its right rear; the ground in front of the position was overgrown with tall jungle grass. In this selected position they awaited the attack of the English.

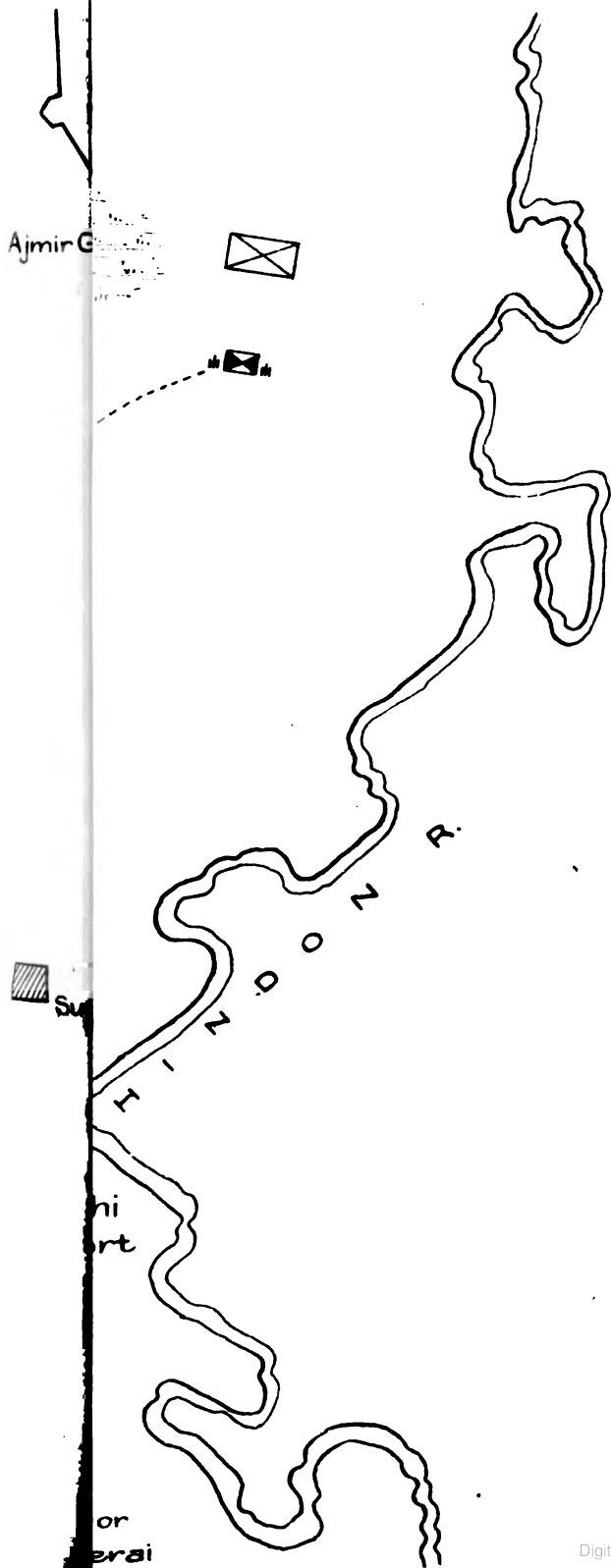
Lake rode out with his cavalry about two miles and then came under such a hot fire that he sent back to order the infantry to advance except guards and piquets and one battalion, which remained to guard camp and baggage. His cavalry and galloper guns in the meantime engaged the attention of the enemy whose fire caused numerous casualties, Lake having his horse shot under him. Owing to the swamps before mentioned, no turning movement was possible, and a frontal attack

on the enemy that were as 4 to 1 and in an entrenched position would have been absurd. Lake, knowing the antecedents of Louis Bourquain, who had been at first a cook in Calcutta and then a pyrotechnist in Lucknow, and who was a vainglorious person, thought that by retiring he might be induced to quit his position. Accordingly Lake retired his cavalry to meet his advancing infantry. The enemy, conceiving this retirement meant that the English were beaten, now advanced with shouts of triumph, bringing their guns along with them. This they continued to do, the sight of the eight battalions of Infantry advancing in column of double companies not being perceived owing to the tall grass and the brigade of retiring cavalry. Then the cavalry trotted off from the centre of each regiment and, passing through the intervals between the infantry column, formed up again to the right rear of the infantry, who now formed line and displayed themselves before the astonished enemy. In vain Bourquain brought his artillery into action; it was now too late: the Company Bahadur's infantry, encouraged by the example of the 76th (now the second battalion West Riding Regiment), marched steadily forward, without taking their firelocks from their shoulders, until within 100 yards of the new alignment of the enemy's guns.

Then the charge was sounded, a volley was fired, and the troops rushed forward with the bayonet, the gallant old Commander-in-Chief leading the men on. The effect of this charge was that the enemy abandoned their new and imperfect alignment and fled. The infantry line at once reformed column of companies to admit of greater intervals, and the cavalry dashed through these intervals with their galloper guns and pursued the flying enemy; and now as they reached the enemy's first position—the whole glorious panorama of the Imperial city, the minars of the Juma Musjid, the battlements of Selimghur and the city walls, the distant Kutub and Humayun's Tomb—rose up to view in the dusty haze. I fancy there must have been many a lusty cheer when that glorious spectacle burst into view. The enemy's cavalry bolted; all the guns and tumbrils were captured; numbers of the infantry were cut up or drowned in the Jumna. The British Infantry reformed line and advanced to the left front and flank and a smaller party on to the village of Ghasipur. Our loss was nearly 500, being  $\frac{1}{3}$  of the force actually engaged; but the enemy lost over 3,000 men. The cavalry pushed on to the Jumna, capturing a battery and dispersing two battalions that had been left as a reserve by Bourquain at the Dehli Ghât.

I do not think this was where the railway bridge now spans the river; but lower down near the Dehli Gate.

The troops were dead beat: remember it was in September, of an extremely dry season. Lake wrote a despatch to the Governor General at 7-30 in the evening and says: "The whole force was under arms for 16 hours." The camp at Sudrpoor seems to have been struck and re-pitched opposite Dehli, for so Lake's despatch is dated. This despatch was not received by Marquis Wellesley in Calcutta until the 23rd September—on the very day that his brother General Wellesley, fought the battle of Assaye. Owing to want of





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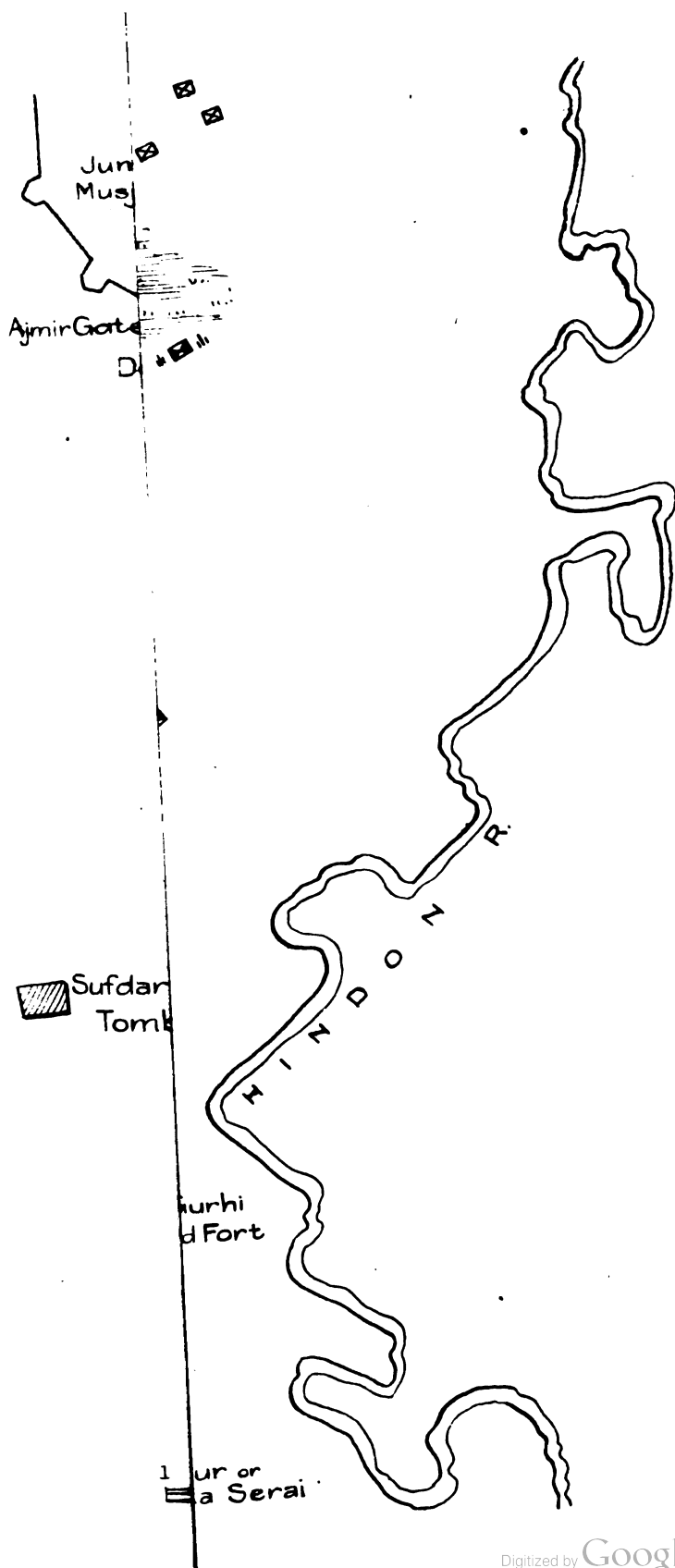


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boats, the British did not completely finish crossing until the 17th September. But on the 16th Lake and his staff were formally received by Shah Allam Badshah. It had hitherto been customary for British officials to enter into the presence of the Moghul Emperor with their boots off. Colonel FitzClarence, who wrote in 1817, says that Lake, on the occasion of his reception by Shah Allam, declined to conform with this custom, stating that boots formed part of a soldier's uniform, and that he could not appear without them. But I believe the British Residents afterwards did take their boots off. In Tehran, when we had to appear before the Shah, the matter was compromised by wearing goloshes over the boots, at a certain spot these were removed, and we entered the Presence, having conformed to the etiquette of the Court; but we never took off our head covering as is customary in India with us at Durbars.

I think Lord Lake's visit to Shah Allam on 16th September 1803 marks the exact date when Dehli became a British possession, and now the task I had set myself is done; but I should much like, had time permitted, to continue and tell you of Agra and Bhurtpore and Lake's ever memorable cavalry chases through the Doab after Holkar and up to the Beas also after the same freebooter. Also about Wellesley's complicated but masterly movements in conjunction with Stevenson in the Deccan: I may, perhaps, on a future occasion; but I must now stop, thanking you for your kind attention.

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#### DISCUSSION.

*Sir Edwin Collen said:—*

Last year I ventured to offer a suggestion in respect to the study of Indian military history, and I asked whether it was not possible for officers in this country to make a study of the campaigns which have been waged in India and to present to us the results of their work. Such studies would not only be intensely interesting to those who pursued them, but most valuable to this institution and to the whole Army.

It is scarcely necessary to remind you of the claims of military history. You will remember those eloquent words of Sir Edward Hamley in his work on the operations of war: "No kind of history so fascinates mankind as the history of wars. No kind of record, other than sacred, appeals at once to the deep sympathies of so wide an audience. Great social, political or philosophical enterprises may produce more extensive results than can follow from the conflict of arms; but a certain amount of acquired knowledge is necessary in order to render them intelligible. The contests of philosophy, of art or of statesmanship, demand from the spectators some of the power which is displayed by the disputants; but every body can watch with interest the game of war, for all can feel how earnest is the struggle, where individuals stake their lives and nations their territories."

As you know we have had the advantage of hearing a clear account of the Sikh wars from Colonel Sinclair, Captain Burton of the Hyderabad Contingent has written a capital description of the battlefields of Assaye and Argaum in the pages of the Journal of this Institution, and now my friend General Lovett has responded in the most admirable way to my suggestion, and has given us an excellent account of the great campaigns of 1803 which were undertaken by the Marquis Wellesley to restore the Peishwa to his throne, while he has dealt more especially with General Lake's campaign against Scindia's forces under Perron at Aligarh and Delhi, culminating in the battle at the latter place. This campaign, and that carried out by General Stuart and General Arthur Wellesley in the Deccan, must always be of the greatest interest to us in India for reasons which General Lovett has given.

A study of the former campaign should be especially interesting to those soldiers who are quartered in this area, and indeed to the whole army. It was admirably conceived, and General Lovett has rightly drawn attention to the manner in which, notwithstanding the extreme difficulty of communication, the movements were carried out over an enormous area of country. In General Lake's campaign we specially see the great value of the use of cavalry, while the manœuvre of pretended retirement, only possible with good troops, is noticeable.

But General Lovett has not been content with giving us this account of the campaigns. He has also supplied us with information of much interest in connection with the state of the army at that time. I confess these details are always very fascinating to me, for it enables us to picture vividly the glories and hardships of those days.

General Lovett has at great labour to himself—and I well know what the labour is—presented us with a most valuable and excellent answer to his question, "when and why did we first take Dehli". We must feel that we have been both instructed and entertained, and I was delighted to hear him say that he might perhaps, at some future day, enter upon the Deccan campaigns.

On your behalf, ladies and gentlemen, I will ask General Lovett to accept our most cordial thanks for the lecture he has just delivered.

### PROCLAMATION

BY HIS EXCELLENCY THE MOST NOBLE THE GOVERNOR GENERAL IN COUNCIL.

Whereas the Governor General in Council has deemed it to be necessary to provide effectual security for the defence of the British Possessions against the designs of Dowlut Rao Scindiah and of the Rajah of Berar.

His Excellency in Council hereby requires all British Subjects holding employment in the Military Service of Dowlut Rao Scindiah, or of the Rajah of Berar, or of any Marhatta Chief, or other Power

or State, confederated with Dowlut Rao Scindiah, or with the Rajah of Berar, forthwith to relinquish the Service of such Chief, Power, or State, respectively, and to repair to such Places as shall have been appointed by the Officers commanding the British Forces in Hindostan and the Dekkan, for the purpose of receiving all such British Subjects, as shall retire from the Service of the said Chiefs, Powers, or States, in obedience to such Proclamations, or Orders, as may have been issued by the said Commanding Officers, in conformity to the Instructions of the Governor General in Council, or in obedience to this Proclamation. And the Governor General in Council is hereby further pleased to declare, that all British Subjects who have retired, or who may retire from the Service of the said Chiefs, Powers, or States, in obedience to any Proclamation issued by the said Commanding Officers, or in obedience to this Proclamation, who shall have been, or shall be admitted by the said Commanding Officers to the Protection of the British Government, shall receive from the Honorable Company, a provision, equal to the amount of the fixed Pay and Allowances, which such British Subjects have received in the Service of the said Chiefs, Powers, or States respectively. The said provision to continue during the continuance of Hostilities between any of the said Chiefs, Powers, or States, and the British Government, and so long as such British Subjects shall be employed in the Service of the Honorable Company; and all such British Subjects after having quitted the Service of the Honorable Company, shall receive a reasonable remuneration, and every indulgence, which their respective situations may appear to require, and which may be consistent with the principles and regulations of the British Government. And the Governor General in Council further declares, that all British Subjects, who shall remain in the Service of Dowlut Rao Scindiah, or of the Rajah of Berar, or of any Marhatta Chief, or other Power or State, confederated with Dowlut Rao Scindiah, or with the Rajah of Berar, and all British Subjects, who shall bear arms against the British Government, shall be considered to have forfeited all Right and Claim to the Protection of the British Government, and shall be treated accordingly.

The Subjects of France, or of any other foreign European, or American State, holding employments in the Military Service of Dowlut Rao Scindiah, or of the Rajah of Berar, or of any Marhatta Chief, or of any Power or State confederated with Dowlut Rao Scindiah, or with the Rajah of Berar, who may be disposed to relinquish the Service of the said Chiefs, Powers, or States, and to repair to such Places as shall have been appointed by the Officers commanding the British Forces in Hindostan and the Dekkan, for the purpose of receiving such British Subjects as shall retire from the Service of the said Chiefs, Powers, or States, shall be admitted to the benefits extended by this Proclamation to all British Subjects.

By Command of His Excellency the Most Noble

The Governor General in Council,

FORT WILLIAM;

J. LUMSDEN,

*The 29th August 1803.*

*Chief Secretary to the Government.*



EXTRACT FROM "TWELVE YEARS' MILITARY ADVENTURE" BY CAPTAIN BLAKISTON.

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The breaking up of such a camp is perhaps a more curious sight than the camp itself. Soon after the *General* has sounded the preparation to march, the tents disappear, and, in their place, an innumerable swarm of living creatures are seen busily moving about like a disturbed ants' nest; or, to a person taking a bird's-eye view of the scene, it would seem as if an immense hatch of oviparous animals had just broken from their shells. Nor is the analogy to a colony of ants lessened, when, after the beating of the assembly, the troops are seen moving off in military order, followed by endless files of baggage-animals and their numerous attendants. In marching, the baggage is supposed to move in a parallel column on the reverse flank of the army; but, in general, when not close to an enemy, or within reach of the predatory horse, the greater part follows the column of march in no very compact order: the rear-guard, which brings up the whole, has therefore, as may be expected, no very enviable duty in so hot a climate. Indeed, on a long march, it is frequently kept out till dark, in the endeavour to urge on the tardy followers, and their jaded, often half-starved, beasts. Excepting the tents of the Europeans, which were carried by elephants provided by the government, the baggage of the army, when I began my military career, was generally carried by bullocks, the commandants of native regiments having at that time the contract for supplying and conveying the camp-equipage of their corps. These latter animals are by no means hardy; and unless supplied regularly with forage of straw or grain, are soon so weak as to be unfit for labour, besides being particularly subject to sore backs. The scenes that occur in consequence on a long march are often amusing to those whose sensibility is not very acute. The various means adopted by the drivers to excite these unfortunate animals to accelerate their pace, or to rise when they have courted the aid of the road in support of their burdens, are ingenious and diverting: sometimes they may be seen twisting the tail with their hands like a straw-rope, or squeezing it between two sticks; at others stooping down and biting it with their teeth; while a lighted wisp of straw, tantamount to the red-hot poker of the Irish carman, is reserved for the *ultima ratio*. An amateur of the picturesque would here find ample scope for the indulgence of an appetite for the ludicrous. The numbers of bullocks which die on a rapid march, from a scarcity of forage, or during a hard night's rain—for they are particularly susceptible of cold—is scarcely credible. When I last served with the army, bullocks had given place to camels, whenever they could be procured. These last are particularly adapted to the purposes of a campaign; for, not only are they more hardy and better marchers than the bullocks, but their chief provender, branches of trees, may mostly be procured when other kinds of forage cannot, perhaps, be found at all.

## EXTRACT FROM THORN'S NARRATIVE.

The better to convey an adequate idea of the nature of Indian warfare, and to show how much depends upon the judgment of a commander placed in very peculiar circumstances, to which previous habits and military experience can hardly afford any rule of conduct, it will be requisite here to give some account of an army in the east, and of the extraordinary elements which contribute to swell its numbers. It is obvious that in a country where no regular supplies can be depended upon, all necessaries must be provided beforehand, or obtained from a train of followers, whose desire of gain attaches them to the service. Hence the line of march increases these appendages to an army, particularly where an enemy, like the one to whom we were opposed, spreads devastation in every direction, for the purpose of cutting off the means of subsistence.

The camp followers in such a case become exceedingly numerous, and may be fairly estimated at ten persons to every fighting man; so that, where the force consists of ten thousand soldiers there will be about one hundred thousand non combatants, consisting of the following descriptions: first, an attendant to every elephant, of which valuable animal there are several hundreds, for carrying the public camp equipage, besides some thousands of camels, to every three of whom there is at least one attendant, with a proportionate number of tent lascars, who, as their appellation imports, are employed in pitching and striking the tents, a service not to be dispensed with in a country where billeting or quartering is unknown, and where bivouacking under the canopy of heaven would soon destroy an army, even without an enemy, from the burning power of the sun by day, and the influence of noxious dews by night.

Every horse, whether of the cavalry or not, has, in addition to the rider, for the most part two attendants, one who cleans and takes care of the animal, and is therefore called the horse-keeper, and another denominated the grass-cutter, who gathers forage, consisting of the roots of grass, which he digs up with an iron instrument resembling a mason's trowel. These roots, being carefully washed, constitute an excellent food; and in fact no other could well be obtained in a climate which, during the season when the hot wind prevails, is so completely bare of vegetation, that not a single blade can be discerned above ground; notwithstanding which dreariness, we have by the means here described been able to preserve all our cattle when encamped on plains exhibiting nothing but an interminable waste of sterility.

Besides an immense number of draught bullocks for the use of the artillery, park and heavy ordnance carts, to every three of which there is at least one driver, large droves of Brinjarree bullocks, from eighty to one hundred thousand, are employed in carrying grain.

These Brinjarrees, or more correctly Bandjarrahs, are a peculiar class of Hindoos, who mix very little with the other tribes. They are a hardy race of people, who live by collecting grain in districts where it is easily procured, and selling it in places where the harvests have been less abundant. Thus they are continually occupied in travelling to great distances, accompanied by their wives and families; and as

they go in large bodies, armed with matchlocks, spears, scimitars, and shields, they can easily stand their ground even against a considerable force. In time of war the Bandjarrahs are of the utmost utility to the party that secures their services for knowing well where grain is to be obtained, when their stock begins to be exhausted they set out to procure fresh supplies either by purchase or plunder.

To these purveyors of the army, as they may be properly called, who, with their connexions, surpass calculation, must be added in the public department the palankeen and doolie bearers, a class of persons at all times necessary in this country, and indispensably so when the fatigues and casualties of war require their assistance for the conveyance of the sick and wounded. An army is further numerically increased by the servants which every officer is under the necessity of employing to take charge of his live and dead stock, for though the private European soldier receives, besides his regular allowance of arrack, rations of meat from the government contractors, who drive large flocks of sheep for that purpose, the officers must provide their own poultry, sheep, and particularly goats to supply them with milk for their tea, a beverage in this country of the most refreshing nature, especially after a long march. The attendants, therefore, which these services render expedient, may be estimated at ten to a subaltern, twenty to a captain, thirty to a field-officer, and so on in proportion. But even the privates themselves are not without their dependants, who contribute to enlarge the population of a camp, there being a cook or bhabajee to every mess, a water carrier, or mesalljee to each tent, in which lie generally ten or twelve soldiers, also a washerman, termed a dhoby, to every troop or company. Such are the immediate adjuncts of a marching force in the east ; but even this is not all, for besides the women, who follow the fortunes of the officers and private soldiers, there is a mixed multitude of different denominations, termed the bazaar people, consisting of merchants and pedlars, with a variety of adventurers of all pursuits, some exercising particular callings, and making themselves useful, while others accompany the army merely with a view to plunder: and yet even these straggling marauders are of material service to the great community upon whom they depend, by searching for the concealed grain, and bringing what they find to market, with other provisions obtained in a similar way, thus preventing the scarcity that might otherwise arise in an exhausted country, where such an enormous consumption must render it every day more difficult to meet the demand. Were it not, indeed, for precautionary measures adopted to guard against absolute want, and the adventitious supplies furnished by eastern cupidity, the march of a large military force in the interior of India would be as presumptuous and fatal, as the invasion of Persia by Julian, or the more eventful expedition of Napoleon against Russia, where the Cossacks, by hanging incessantly on the flanks of the confederated armies, and cutting off all the means of supply for such an assembled mass, resembled the Maharrattas. Military operations upon a large scale in India would be equally destructive to those who embark in them, if, like the exile of St. Helena, they were to depend upon future resources, and endeavour to inspire their famishing troops by promising them the spoliation of a capital.

## EXTRACT FROM LIEUTENANT MOOR'S NARRATIVE.

During the time the Bhow's army remained with Lord Cornwallis, our gentlemen had frequent opportunities of paying friendly visits in the grand army, and many gentlemen thence were in the habit of visiting their friends with us. On the march, the flanks of our baggage sometimes intermixed, and some of the officers had opportunities of observing the order of march in the Mahratta army. They were particularly struck with the singular appearance of the Bhow's guns on the line of march, and truly, to a stranger, they did cut rather a unique figure. His largest guns were brass 32 and 42 pounders, cast at Poona, in length far exceeding ours; the wheels of the carriages, as well as the carriages themselves, were exceedingly clumsy, particularly the limber wheels, which are generally of one piece, very low, and in a heavy road do not, perhaps, turn once in the distance of a hundred yards. The gun is so heaped up with baggage of every description, that it could not be cleared ready to fire, under, at least, half an hour; nor could any one from its appearance, in its travelling state, were it not for the number of bullocks dragging it, conceive it to be a gun: fifty, sixty, and sometimes a hundred couple of bullocks, drag one of these guns: and in very heavy roads, where the cattle have been hard worked and ill fed, an elephant is posted in the rear, who pushes it with his head over difficult passages. Although the improvement of having four bullocks abreast was lately adopted by the Mahrattas, there surely can be no utility in having such a string of cattle, as they sometimes tack to one of these strange pieces of ordnance.

Under the idea that an account of the method of marching and encamping, observed by the Mahrattas, will be interesting, we shall give it, at some length, with a description of the Bhow's camp, &c.

If the army, over night, is ordered to march at daybreak, it is generally cried through the camp by fakeers, and other poor persons, who walk through the streets proclaiming the news as soon as it transpires, for which they receive trifling alms from the bazaar people, and others, interested in the intelligence. It is also proclaimed by the nagarah, which is a large drum-like instrument, carried generally on a camel, sometimes on an elephant, and is heard to a great distance; the fakeers, however, are almost always the earliest. The quarter-master general, called the beenee-wollah, with a body of five, six, or eight thousand horse, according to the situation of the army with regard to the enemy, moves at the first nagarah, which beats between three and four o'clock: he pitches on the spot the new encampment, in which, without considering much of the strength of his position, he is chiefly guided by its vicinity to a stream or mass of water. A small party is instantly dispatched back to camp with the intelligence of the distance, &c., and as these armies are always well supplied with guides, the news is sent to the heads of departments and the different bodies of which the army is composed, who, also, have their hircarrahs, or guides; or if, as is generally the case, the country is well known, the spot for the new encampment is pitched upon before the beenee-wollah moves, or the night before.

By daybreak, when the second nagarah beats, the tents of the army are struck, and with the other baggage, packed ready for moving; and, although, in strictness, they should wait for the third nagarah, they proceed, with followers of all descriptions, without any kind of regularity, as fast as convenient, to the new ground.

It must be observed that Mahratta armies are composed of different bodies, from different quarters of the empire, under the separate command of their respective chieftains, each of whom has a distinguishing flag, which is early sent forward to the new ground, and its station being pointed out by the beenee-wollah, it is immediately erected, so that all the parties, adherents and followers of that chief, know where to go by seeing their flag flying, which is large and lofty, as soon as the new ground of encampment is in sight. Twenty or perhaps, more of these flags are with the Bhow's army.

To avoid the inconvenience of marching with the mob, on ordinary occasions, the general did not beat in our line until an hour, sometimes two, or more, after the advance of the Mahrattas had left the ground; for these people having no idea of regularity, at first, without any ceremony, would ride, or run, between the divisions of our line; and it was not before some of them were roughly handled, that we could keep the line clear from their intrusions: latterly, when on the march we have come in contact with the Nizam's army or camp, the same obstructions would occur, and as the Nizamites sometimes persisted in impeding us, the sepoys have been obliged to apply the butts of their musquets rather severely to remove and prevent such impediments; more than once swords were drawn to effect a passage between our divisions; and on these occasions the offenders were sure of being heartily drubbed. The Arabs it was, in general, we found most troublesome: the haughty inflexibility of these people is well known. Once, we believe it was crossing the Toombudra, a party of these people disputed the precedency with our line, and notwithstanding Captain Little was present, actually used blows to support their pretensions: one or two of our officers felt them; still great tenderness was observed in putting the transgressors away; the sepoys, who could hardly be restrained, using the butts of their musquets only to punish such insolence. Of late, having learned better manners, they wait with respectful patience, until the whole line has passed; and sometimes, although it was highly irregular, they have been permitted to pass between our divisions, to shew them that politeness and deference would procure them an indulgence, which insolence and presumption could never effect.

To avoid, however, the probability of such obstructions, our detachment generally moved an hour or two after the advance of the Mahrattas, unless in situations where the enemy were in front, when we, of course, took the post of honour, and brought up the rear when moving from the direction in which the enemy were supposed to be.

The Bhow with his body guard of six or eight thousand horse attended by his state elephants, caparisoned with their howdahs and amharas himself, in his palankeen, or on horseback; his principal officers, in the same mode of conveyance, preceded by choabdars,

music, &c., &c., mostly came last, and on his arrival at the new ground always found a suite of tents ready pitched for his reception : the spot chosen for him was almost always in the rear of our line.

Our spot was taken up by Captain Little, if possible, clear of the Mahratta camp, with an open front to the supposed direction of the enemy.

The Bhow and the last party being arrived, and sometimes before they arrived, a body of horse is sent out to protect the foragers ; three or four thousand compose this body, or more, if the enemy are, in force and near ; it is accompanied by crowds of elephants, camels, horses, bullocks, men, and women, who return when loaded.

Although the topekhana, or park, the British detachment, and most of the different chiefs, have their own bazaars attached to them, the grand public bazaar of the army is of vast extent, regularly disposed in strait streets, if the ground will admit of it, and each shop in the same relative situation.

The park is sometimes in the centre and sometimes on the flanks of the camp, and the cavalry are picketed without order or regularity around the standards of their respective chiefs. As to the infantry, we know not how they were disposed of, for they are in general so contemptible as soldiers, that they hardly deserve notice. The best of them are called gardees, of whom the Bhow has five or six thousand, armed, clothed, and disciplined, in imitation of Tippon, at least so attempted, after the European manner ; their coats are of red serge with a blue collar and cuff, cut in the country taste, to lap over before and tie with strings ; their arms, it is true, are for the most part English, and out of twenty, two will be found without locks, six without cocks, and, perhaps, not a flint among the remaining twelve : their discipline is in much the same state with their arms and appearance. In addition to the musquet, most of the gardees carry a sword or a pistol, and such as have bayonets keep them constantly fixed, which, as well as having a more warlike appearance, saves the incumbrance of a scabbard and belt. These troops, being esteemed the best, have assigned to them the important post of defending the park, with, and near which, we believe, they generally march and pitch. The gardees were said originally to have amounted to twelve thousand, but many of them have been left to garrison forts taken by the Bhow, from which, and other reductions about half that number would, we conjecture, be nearer their present strength. They are commanded by Gopal Punt, who is buckshee, or paymaster to all the infantry, and, to give our own terms to their officers, deputy treasurer ; Chinto Punt Phirnavees, being cash keeper, and second to the Bhow in council ; Hurry Punt Tantea, his assistant : they are all bramins, as their names denote.

The remainder of the infantry is composed of small corps of Mahrattas, Rohillas, Arabs, and *molley* corps ; one of which, and by far the most respectable, has already been mentioned in the occurrences before Darwar, commanded by the brave, but unfortunate Mr. Yvon. The irregular corps of Rohillas and Arabs are, in our estimation, by far the best infantry in the Mahratta service ; they are armed with matchlocks, swords and targets, or both ; some with spears some with bows and arrows, and some with all together.

## EXTRACT FROM MAJOR DIROM'S NARRATIVE.

The Mahratta camp was at the distance of about six miles from ours, and, on approaching it, had the appearance of a large irregular town; for the chiefs pitch their standards, and take up their ground around their general, without order; and their tents being of all sizes, and of many different colours, at a distance resemble houses, rather than canvas. The streets, too, of their camp, crossing and winding in every direction, display a variety of merchandize, as in a great fair. There are shroffs, jewellers, smiths, mechanics, and people of every trade and description, as busily employed in their occupations, and attending as minutely to their interest, as if they were in Poonah, and at peace. The Bombay detachment, advanced always at some distance in their fronts served as a picquet to their camp; and they had some outposts of their own, established more with a view to cover the supplies coming in to their army, than to guard against a surprise from the enemy.

The park of artillery, where all their guns are collected, made an extraordinary appearance. The gun carriages, in which they trust to the solidity of the timber, and use but little iron in their construction, are clumsy beyond belief; particularly the wheels, which are low, and formed of large solid pieces of wood united. The guns are of all sorts and dimensions; and, having the names of their gods given to them, are painted in the most fantastic manner; and many of them, held in esteem for the services they are said to have already performed for the state, cannot now be dispensed with, although in every respect unfit for use. Were the guns even serviceable, the small supply of ammunition with which they are provided has always effectually prevented the Mahratta artillery from being formidable to their enemies.

The Mahratta infantry, which formed part of the retinue that attended the chiefs at the conference, is composed of black Christians, and despicable poor wretches of the lowest caste, uniform in nothing but the bad state of their musquets, none of which are either clean or complete; and few are provided with either ammunition or accoutrements. They are commanded by half-caste people of Portuguese and French extraction, who draw off the attention of spectators from the bad clothing of their men, by the profusion of antiquated lace bestowed on their own; and if there happens to be a few Europeans among the officers and men, which is sometimes the case, they execrate the service, and deplore their fate.

The Mahrattas do not appear to treat their infantry with more respect than they deserve, as they ride through them without any ceremony on the march, and on all occasions evidently consider them as foreigners, and a very inferior class of people and troops. Indeed the attention of the Mahrattas is directed entirely to their horses and bazars, those being the only objects which immediately affect their interest. On a marching day, the guns and the infantry move off soon after daylight, but rarely together; the bazars and baggage move nearly about the same time, as soon as they can be packed up and got

ready. The guns and tumbrels, sufficiently unwieldy without farther burden, are so heaped with stores and baggage, that there does not seem to be any idea of its ever being necessary to unlimber, and prepare for action on the march. As there are no pioneers attached to the Mahratta artillery to repair the roads, this deficiency is compensated by an additional number of cattle, there being sometimes a hundred, or a hundred and fifty bullocks, in a string of pairs. to one gun : the drivers, who are very expert, sit on the yokes, and pass over every impediment, commonly at a trot. The chiefs remain upon the ground, without tents, smoking their hookers, till the artillery and baggage have got on some miles ; they then follow, each pursuing his own route, attended by his principal people ; while the inferiors disperse, to forage and plunder over the country.



*In the foregoing lecture the following authorities have been consulted.*

1. Wellington's despatches, 1836, volumes I and II.
2. Wellesley's despatches, 1837 volumes III, IV and V.
3. Thom's Narrative, 1818.
4. Notes on the Mahratta War. (Fort William 15 December 1803) 1 volume.
5. Events and Transactions in India, 1805—being a Translation from No. 256 of the "Moniteur" 5 June 1805, which contained a translation of despatches from Marquis Wellesley to the Secret Committee, seized on board the "Hope," East Indiaman, captured by the French.
6. Chesney's Indian Polity.
7. Malleson's Last French struggles in India.
8. History of India by James Mill, 1834.
9. Carey's Old Company days.
10. Stubbs' History of the Bengal Artillery.
11. Buckle's History of the Bengal Artillery (1852)
12. Major Dirom's Narrative, 1793.
13. Lieutenant Moor's Narrative 1794.
14. Fraser's Life of Colonel Skinner.
15. Fitz Clarence. Journal across India, 1817.
16. Twelve years military adventures by Captain Blakiston, Madras Engineers, 1824.
17. Analytical view of the Manual and Platoon exercise by Captain James, Calcutta, 1811.
18. Military adventures in Hindustan by Herbert Campton.
19. Life of Lord Minto by Countess Minto, 1880.
20. Mc'Donald's Uniform of the Royal Artillery.
21. Luard's uniforms of the British Army.
22. Broughton's letters from a Mahratta camp, 1809.
23. Roll of Royal Engineer officers.
24. Lord Lake's M.S.S. General Order in Adjutant General's Office, Simla.
25. Franklin's life of George Thomas.
26. The Atlas of India, etc. etc.

## CAMPAIGN OF 1803.

## Synoptical Table of military movements.

Date.	Wellesley.	Sievenson.	Scindia.	Holkar.	Bhonsla.
1803.					
4th February	.....	....	Crosses Norbudda; returns Rurhanpur. Colonel Collins joins.	....	
23rd "	.....	.....	....	....	
27th "	.....	....	....	....	
28th "	.....	Leaves Haidatabad	....	....	
9th March	Leaves Harihur with 32 guns '2.87 E., 8320 N.	....	....	....	
12th "	Crosses Tuonga Budra	.....	....	....	
14th "	Crosses Werda at Deoghari	....	....	....	
25th "	Crosses Malpura at Singoli	Reaches Peindah	Kalpi garrisoned	Leaves Puna. .... Moves to Ahmednagar and Chaud re.	
29th "	Crosses Cutpura at Gurghuri	.....	....	....	
1st April	At Error on Kishna	....	....	Futeh Singh and Mir Khan retreat before Wellesley and Sievenson. Desert Holkar and join Nizam and Peshwah.	
5th "	20 miles North-East Meruj	....	....	....	
8th "	At junction Bimah and Nira	....	....	....	

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To these purveyors of the army, as they may be properly called, who, with their connexions, surpass calculation, must be added in the public department the palankeen and doolie bearers, a class of persons at all times necessary in this country, and indispensably so when the fatigues and casualties of war require their assistance for the conveyance of the sick and wounded. An army is further numerically increased by the servants which every officer is under the necessity of employing to take charge of his live and dead stock, for though the private European soldier receives, besides his regular allowance of arrack, rations of meat from the government contractors, who drive large flocks of sheep for that purpose, the officers must provide their own poultry, sheep and particularly goats to supply them with milk for their tea, a beverage in this country of the most refreshing nature, especially after a long march. The attendants, therefore, who these services render expedient, may be estimated at ten to a subaltern, twenty to a captain, thirty to a field-officer, and so on in proportion. But even the privates themselves are not without their dependants, who contribute to enlarge the population of a camp, there being a cook or bhabajee to every mess, a water carrier, or mesallee to each tent, in which lie generally ten or twelve soldiers, also a washerman, termed a dhoby, to every troop or company. Such are the immediate adjuncts of a marching force in the east; but even this is not all, besides the women, who follow the fortunes of the officers and private soldiers, there is a mixed multitude of different denominations, termed the bazaar people, consisting of merchants and pedlars, with a variety of adventurers of all pursuits, some exercising particular callings, and making themselves useful, while others accompany the army merely with a view to plunder: and yet even these straggling marauders are of material service to the great community upon whom they depend by searching for the concealed grain, and bringing what they find to market, with other provisions obtained in a similar way, thus preventing the scarcity that might otherwise arise in an exhausted country where such an enormous consumption must render it every day more difficult to meet the demand. Were it not, indeed, for precautionary measures adopted to guard against absolute want, and the adventitious supplies furnished by eastern cupidity, the march of a large military force in the interior of India would be as presumptuous and fatal, as the invasion of Persia by Julian, or the more eventful expedition of Napoleon against Russia, where the Cossacks, by harrying incessantly on the flanks of the confederated armies, and cutting off all the means of supply for such an assembled mass, resembled the Mahrattas. Military operations upon a large scale in India would be equally destructive to those who embark in them, if, like the case of St. Helena, they were to depend upon future resources, and endeavour to inspire their famishing troops by promising them the acquisition of a capital.

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Under the idea that an account of the method of marching and encamping, observed by the Mahrattas, will be interesting, we shall give it, at some length, with a description of the Bhow's camp, &c.

If the army, over night, is ordered to march at daybreak, it is generally cried through the camp by fakeers, and other poor persons, who walk through the streets proclaiming the news as soon as it transpires, for which they receive trifling alms from the bazaar people, and others, interested in the intelligence. It is also proclaimed by the nagarah, which is a large drum-like instrument, carried generally on a camel, sometimes on an elephant, and is heard to a great distance; the fakeers, however, are almost always the earliest. The quarter-master general, called the beenee-wollah, with a body of five, six, or eight thousand horse, according to the situation of the army with regard to the enemy, moves at the first nagarah, which beats between three and four o'clock: he pitches on the spot the new encampment, in which, without considering much of the strength of his position, he is chiefly guided by its vicinity to a stream or mass of water. A small party is instantly dispatched back to camp with the intelligence of the distance, &c., and as these armies are always well supplied with guides, the news is sent to the heads of departments and the different bodies of which the army is composed, who, also, have their hircarrahs, or guides; or if, as is generally the case, the country is well known, the spot for the new encampment is pitched upon before the beenee-wollah moves, or the night before.

By daybreak, when the second nagarah beats, the tents of the army are struck, and with the other baggage, packed ready for moving; and, although, in strictness, they should wait for the third nagarah, they proceed, with followers of all descriptions, with a kind of regularity, as fast as convenient, to the new ground.

It must be observed that Mahratta armies are composed of different bodies, from different quarters of the empire, under the command of their respective chieftains, each of whom has a distinguishing flag, which is early sent forward to the new ground, the station being pointed out by the bheene wollah, it is erected, so that all the parties, adherents and followers of the chief, know where to go by seeing their flag flying, which is large and conspicuous; as soon as the new ground of encampment is in sight, it is perhaps, more of these flags are with the Bhew's army.

To avoid the inconvenience of marching with the mob, on some occasions, the general did not lead in our line until an hour or sometimes two, or more, after the advance of the Mahrattas had taken ground; for these people having no idea of regularity, at a distance cut any ceremony, would rise, or run, between the divisions of the line; and it was not before some of them were roughly handled, we could keep the line clear from their intrusions; finally, when the march we have come in contact with the Nizam's army or a party of the same, obstructions would occur, and as the Nizamites sometimes insisted in impeding us, the sepoys have been obliged to apply their muskets rather severely to remove and prevent such impediments; more than once swords were drawn to effect a passage between the divisions; and on these occasions the offenders were severely and heartily rebuked. The Arabs it was, in general, we found most troublesome; the horrid inflexibility of these people is well known. Once, when we were in the neighbourhood of the Arabian Sea, a party of these people disputed the precedence with our men, and notwithstanding that little was present, actually used blows to support their pretensions; one or two of our officers felt the unpleasantness was in the way of putting the things off, away; the sepoys who could not be restrained, using the butt of their musquets only to point at us in silence. Oh! they have got a better manner, they were respectful politeness, until the whole line has passed, and as they are, although it was highly improper, they have been permitted to pass between our divisions, to show them that politeness and civility would produce them an advantage, which insulter and provoker could never effect.

To avoid, however, the probability of such obstructions, our detachments generally move forward an hour or two after the advance of the Mahrattas, unless instructions were the contrary; the army were in front of us, we, of course, took the post of honour, and brought up the rear when moving from the direction in which the enemy were supposed to be.

The Bhew, with his household of six or eight thousand, accompanied by his state elephants, accompanied with the Bhew, as a guard, himself, in his palanquin, or on his elephant; his private officers, in the same mode of conveyance, preceded by elephants

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Although the *topekhanas*, or park, the British detachment, and most of the different chiefs, have their own bazaars attached to them, the grand public bazaar of the army is of vast extent, regularly disposed in strait streets, if the ground will admit of it, and each shop in the same relative situation.

The park is sometimes in the centre and sometimes on the flanks of the camp, and the cavalry are picketed without order or regularity around the standards of their respective chiefs. As to the infantry, we know not how they were disposed of, for they are in general so contemptible as soldiers, that they hardly deserve notice. The best of them are called *gardes*, of whom the Bhow has five or six thousand, armed, clothed, and disciplined, in imitation of Tipoo, at least so attempted, after the European manner; their coats are of red serge with a blue collar and cuff, cut in the country taste, to lap over before and tie with strings; their arms, it is true, are for the most part English, and out of twenty, two will be found without locks, six without cocks, and, perhaps, not a flint among the remaining twelve: their discipline is in much the same state with their arms and appearance. In addition to the musquet, most of the *gardes* carry a sword or a pistol, and such as have bayonets keep them constantly fixed, which, as well as having a more warlike appearance, saves the incumbrance of a scabbard and belt. These troops, being esteemed the best, have assigned to them the important post of defending the park, with, and near which, we believe, they generally march and pitch. The *gardes* were said originally to have amounted to twelve thousand, but many of them have been left to garrison forts taken by the Bhow, from which, and other reductions about half that number would, we conjecture, be nearer their present strength. They are commanded by Gopal Punt, who is *buckshee*, or paymaster to all the infantry, and, to give our own terms to their officers, deputy treasurer; Chinto Punt Phirnavées, being cash keeper, and second to the Bhow in council; Hurry Punt Tantea, his assistant: they are all *bramins*, as their names denote.

The remainder of the infantry is composed of small corps of Mahrattas, Rohillas, Arabs, and *motley* corps; one of which, and by far the most respectable, has already been mentioned in the occurrences before Darwar, commanded by the brave, but unfortunate Mr. Yvon. The irregular corps of Rohillas and Arabs are, in our estimation, by far the best infantry in the Mahratta service; they are armed with matchlocks, swords and targets, or both; some with spears, some with bows and arrows, and some with all together.

## EXTRACT FROM MAJOR DIROM'S NARRATIVE.

The Mahratta camp was at the distance of about six miles from ours, and, on approaching it, had the appearance of a large irregular town; for the chiefs pitch their standards, and take up their quarters around their general without order; and their tents being of all sorts and of many different colours, at a distance resemble houses, rather than canvas. The streets, too, of their camp, crossing and crossing in every direction, display a variety of merchandise, as if it were a great fair. There are shoofhs, jewellers, smiths, mechanics, and persons of every trade and description, as busily employed in their occupations and attending as minutely to their interest, as if they were in the midst of peace. The Bombay detachment, advanced always at a short distance in their fronts served as a picquet to their camp; and there are some outposts of their own established more with a view to cover their supplies coming in to their army, than to guard against a surprise from the enemy.

The park of artillery, where all their guns are collected, make an extraordinary appearance. The gun carriages, in which they trust to the solidity of the timber, and use but little iron in their construction are clumsy beyond belief; particularly the wheels, which are formed of large solid pieces of wood united. The guns are of all sorts and dimensions; and, having the names of their gods given to them, are painted in the most fantastic manner; and many of them, held in esteem for the services they are said to have already performed for the state, cannot now be dispensed with, although in every respect unfit for use. Were the guns even serviceable, the small supply of ammunition with which they are provided has always effectually prevented the Mahratta artillery from being formidable to their enemies.

The Mahratta infantry, which formed part of the retinue that attended the chiefs at the conference, is composed of black Christians and deplorable poor wretches of the lowest caste, uniform in nothing but the bad state of their muskets, none of which are either clean or complete; and few are provided with either ammunition or accoutrements. They are commanded by half-caste people of Portuguese and French extraction, who draw off the attention of spectators to the bad clothing of their men, by the profusion of antiquated lace bestowed on their own; and if there happens to be a few Europeans among the officers and men, which is sometimes the case, they execrate the service, and deplore their fate.

The Mahrattas do not appear to treat their infantry with more respect than they deserve, as they ride through them without any ceremony on the march, and on all occasions evidently consider them as foreigners, and a very inferior class of people and troops. Indeed the attention of the Mahrattas is directed entirely to their houses and bazars, these being the only objects which immediately affect their interest. On a marching day the guns and the infantry move off some a few days later, but rarely together; the bazars and baggage move nearly about the same time, as soon as they can be packed up and get

ready. The guns and tumbrels, sufficiently unwieldy without farther burden, are so heaped with stores and baggage, that there does not seem to be any idea of its ever being necessary to unlimber, and prepare for action on the march. As there are no pioneers attached to the Mahratta artillery to repair the roads, this deficiency is compensated by an additional number of cattle, there being sometimes a hundred, or a hundred and fifty bullocks, in a string of pairs. to one gun: the drivers, who are very expert, sit on the yokes, and pass over every impediment, commonly at a trot. The chiefs remain upon the ground, without tents, smoking their hookers, till the artillery and baggage have got on some miles; they then follow, each pursuing his own route, attended by his principal people; while the inferiors disperse, to forage and plunder over the country.



*In the foregoing lecture the following authorities have been consulted.*

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20. Mc'Donald's Uniform of the Royal Artillery.
21. Luard's uniforms of the British Army.
22. Broughton's letters from a Mahratta camp, 1809.
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26. The Atlas of India, etc. etc.

## CAMPAIGN OF 1803.

## Synoptical Table of military movements.

Date.	Wellesley.	Stevenson.	Scindia.	Holkar.	Bhonsla.
1803.					
4th February	.....	.....	Crosses Nerbudda; returns Burhanpur. Colonel Collins joins.	.....	
23rd "	.....	.....	.....	.....	
27th "	.....	.....	.....	.....	
28th "	.....	Leaves Haidarabad	.....	.....	
9th March	Leaves Harihur with 32 guns '2487 E., 8240 N.	.....	.....	.....	
12th "	Crosses Tuonga Budra	.....	.....	.....	
14th "	Crosses Werda at Deoghari	.....	.....	Leaves Puna.	
25th "	Crosses Malpura at Singoli	Reaches Perindah	Kalpi garrisoned	Moves to Ahmednagar and Chand re.	
29th "	Crosses Cutpura at Gurghuri	.....	.....	.....	
1st April	At Error on Kishna	.....	.....	Futeh Singh and Mir Khan retreat before Wellesley and Stevenson Desert Holkar and join Nizam and Peshwah.	
5th "	20 miles North-East Meruj	.....	.....	.....	
8th "	At junction Bimah and Nira	.....	.....	.....	

Date.	Wellesley.	Stevenson.	Scindia.	Holkar.	Bhonsla.
15th April 1803	At Akluj ...	At Akluj ...	....	Amrut Roa leaves Puna ...	Mobilises large force near Nagpore.
16th "	Baramoti to Puna, 60 miles, with cavalry.	Moving to Gardoon ...	....	Has interview with Amboji Tuglia; advances 3 marches on Puna.	....
21st "	....	....	....	....	....
23rd "	Orders Murray to take Panwell and Abbah.	....	....	....	....
26th "	Karnulla on road from Bombay to Puna besieged.	....	....	Encamp near Dowletabad.	....
28th "	....	Ordered advance 3 marches North Gardoon to take up position on the Sina, 50 miles North Gardoon.	Leaves Burhanpur for Puna. Columns does not object.	Camp near Aurangabad with 1 Brig Infantry and 30,000 Horse.	Marches on Omraoti.
6th May	....	....	....	..	....
7th "	Objects to Scindia's move on Puna	....	....	....	....
8th "	Requests larger Powers	....	At Shahpur ...	....	....
12th May	Murray takes Karnullah	About 50 miles from Aurangabad Move to Putton on Godaveri.	At Eadlabad ...	Leaves Aurangabad. Moves towards Chandore.	....
13th "	Peshwah returns to Puna	....	....	....	....
16th "	....	....	Amboji with 16 battalions goes to Hindustan.	Amrut Roa at Sungum Nair.	....

26th "	Coins money to pay his troops ...	.....	Collins at Chickley is told to await meeting with Bhonsla; then will be told whether it is to be Peace or War.	.....	North of Tapti owing want of fodder; feeds horses on mango leaves.	Advancing to meet Scindia with 6,000 Infantry, 40 guns and 20,000 Horses near Mulkapur.
27th "	Detained want of iron to mend wheels.	.....			.....	.....
4th June	Charowly	.....	At Chickley with 28 battalions, 170 guns.	.....	.....	.....
5th "	Bar dowly across Bima. Forage scarce.	Major Johnson meets with a reverse.	At Mulkapur with 18,000 Horse	.....	At Durup near Chandore ..	.....
6th "	Kaidurchiswady	.....	.....	.....	.....	.....
7th "	Paglah	.....	.....	.....	.....	.....
9th "	Crosses Goor	.....	.....	.....	Abboona North, 30 of Durup. (Heavy rain.)	.....
10th "	Crosses Kukra	.....	Collins demands to leave camp.	.....	.....	.....
12th "	.....	.....	.....	.....	.....	.....
13th "	.....	.....	Scindia meets Bhonsla	.....	.....	Bhonsla meets Scindia.
14th "	Angah, 20 miles south	Ordered to Aurangabad	.....	.....	.....	.....
15th "	Ahmednagar. (Heavy rain)	.....	.....	.....	.....	.....
19th "	Roori, 10 days' halt. Lost 1,450 bullocks in three days.	Nizam's troops at Aurangabad.	.....	.....	One march North Tapti ..	.....
26th "	Governor-General at Calcutta gives full powers to General Wellesley.	Roshengaum	Perron directs Bourguim to retire on Panipat with 3rd Brigade, 2nd Brigade at Agra.	.....	.....	.....
28th "	Sirur on Goor occupied	.....	.....	.....	.....	.....
3 th "	Petalgaum. Supplies from Puna by kuli transport. Part of reserve at Mudgul withdrawn to observe Pondicherry.	.....	.....	.....	.....	.....

Date.	Lake.	Wellesley.	Stevenson.	Scindia.	Holkar.	Bhonsla.	Murray, Gujarat.	Harcourt, Kuttak.
1803.								
2nd July ...	...	Taka on Godavari occupied.	...	Mulkapur ...	...	...	...	...
20th ...	...	Baumgotta ...	...	...	...	...	...	...
22nd ...	...	Sangwi ...	...	7 battalions under Dadrénac leave for Hindustan. Perron goes to Agra.	...	Separates from Scindia; prepares to go Adjanta Ghât.	...	...
24th ...	...	Orders Scindia to retire	...	...	...	...	...	...
28th ...	...	Full powers received from Governor-General.	...	...	...	...	...	...
...	...	Reserve at Mudgal ordered by to retire into British territory.	...	Collins demands withdrawal of troops.	...	Collins demands withdrawal of troops.	...	...
2nd ...	...	...	...	Collins at Jalgaum reports 11 battalions, 18,500 Horse and 205 guns present.	...	At Jalgaum with 6,000 Infantry, 20,000 Horse and 35 guns.	...	...
28th ...	...	Collins announces imminent departure from Scindia's camp. Reserve at Mudgal reduced to 4,000 under General Campbell.	23,000 men in camp ...	...	...	...	...	...
2nd ...	...	Rooke on Sindia ...	...	...	...	...	...	...

1st Aug. ...	...	Waltl ...	Reinforces Tola; communicates with Sangha-ur.	...	Collins leaves Scindia	...	Wishes to General Wellesley proposing to retire to Bahampur conditionally on Wellesley's retiring on Seringapatam.	Ordered from Pina to command his Cavalry.	...
2nd ...	...	...	...	...	...	...	...	...	...
6th ...	...	Proposes moving against Ahmednagar when rain over.	Moves southwards ...	...	Collins at Tandupur	...	...	...	...
7th ...	Leaves Cawnpur	...	...	...	...	...	...	...	...
8th ...	Mundesa	Attacks Pettah of Ahmednagar.	...	...	...	...	...	...	...
9th ...	Suralpur ...	Batteries against Fort	...	...	...	...	...	...	...
10th ...	Bellare	Battering ...	...	...	...	...	...	...	...
11th ...	Halt ...	Killadar gives in and	...	...	...	...	...	...	...
12th ...	Halt ...	Marches out with 1,400 men.	Advances Guard at Ad-junta.	...	Moves towards Ad-junta.	...	...	...	...
13th ...	Aroul ...	Cavalry and 1 battalion to Tola.	...	...	...	...	...	...	...
14th ...	Mirganj ...	Leaves 1 battalion and 6 guns at Ahmednagar.	...	...	Moves eastward towards Jafnabad.	...	...	...	...
15th ...	...	...	...	...	...	...	...	...	...
16th ...	Kotlahgunj	...	...	...	...	...	...	...	...
17th ...	Sekundurpur	Writes to Lake	...	...	...	...	...	...	...
18th ...	Nabighunj ...	Nimderahghat	...	...	...	...	...	...	...
19th ...	Bhimgunj	Kantore	...	...	...	...	...	...	...
20th ...	Malpur ...	Karivandl. 1 cavalry cross Godavari.	...	...	...	...	...	...	...

Date.	Label.	Wednesday.	Sterecum.	Scindia.	Bombay.	Bhopal.	Murray, Gujerat.	Harcourt, Kutchak.
July 1st		Taken on Godavari occasion. Pond.		Mulapuz				
July 2nd		Ranwagga						
July 3rd		Sangar		9 battalions under Duke at ease for M. L. G. P. P. P. P. P. gone to Agra.		Separates from Scin- dia; prepares to go Ajanta Ghats.		
July 4th		On duty in India to retire						
July 5th		Full powers received from Governor-General.						
July 6th		Reserve at Madras ordered by Government to British territory.		Celina demands withdrawal of troops.		Celina demands withdrawal of troops.		
July 7th				Celina at Jaipuram reports 11 battalions, 1500 horse and 200 guns present.		At Jaipuram with 8000 Infantry, 2000 Horse and 35 guns.		
July 8th		Celina announced in the news that he had been notified to the Governor of Madras and to return to his duties in the British territory.	12,000 men to camp					
July 9th		Ready to move						

2nd Aug. ...	...	Wahl ...	Reinforces Tola i com- municates with Saugh- ar.	...	Collins leaves Scindia	...	Ordered from Pore to command in Gajeral.	...
3rd ...	...	...	...	...	...	...	...	...
6th ...	...	Propose moving against Ahmednagar when rain over.	Moves southwards ...	...	Collins at Tandupur	...	...	...
7th ...	Leaves Cawnpur	...	...	...	...	...	...	...
8th ...	Mundana	Attacks Petah of Ahmednagar.	...	...	...	...	...	...
9th ...	Surajpur ...	Batteries against Fort	...	...	...	...	...	...
10th ...	Bellare ...	Battering ...	...	...	...	...	...	...
11th ...	Halt ...	Killadar gives in and	...	...	...	...	...	...
12th ...	Halt ...	Marches out with 1,400 men.	Advance Guard at Ad- junta.	...	Moves towards Ad- junta.	...	...	...
12th ...	Aroul ...	Cavalry and 1 battalion to Tola.	...	...	...	...	...	...
14th ...	Mirganj ...	Leaves 1 battalion and 6 guns at Ahmedna- gar.	...	...	Moves eastward to- wards Jadrabad.	...	...	...
15th ...	...	...	...	...	...	...	...	...
16th ...	Koslahgunj	...	...	...	...	...	...	...
17th ...	Sekundurpur	Writes to Lake	...	...	...	...	...	...
18th ...	Nabiganj ...	Nimderahghat	...	...	...	...	...	...
19th ...	Bhimganj	Kantere	...	...	...	...	...	...
20th ...	Malinpur ...	Karivandi, 2 cavalry cross Godavari.	...	...	...	...	...	...



Date.	Loc.	Wellesley.	Stevenson.	Scindia.	Holkar.	Bhonsla.	Murray, Gujerat.	Harcourt, Kutch.
1803.								
21st August	Saket (Doolapore) ...	Sarbugaon. Infantry cross in coracles.	...	...	Supposed gone to Indore.	Returned to Badoli Pass moving to Bahrampur.	Leaves Baroda ...	...
22nd "	Etah (Kolra) ...	Toka on Godaveri ...	Divalehat and Badoli; Infantry sent to Jafabad.	Gopal Bhow leaves Kasabari Châ; invades by Adjunta Pass; occupies Jalna. (having alight through between Stevenson and Wellesley) tries to plunder Budnapur.	...	Occupies Jalna.	...	...
23rd "	Sekundra ...	Toka ...	...	...	...	...	...	...
25th "	Halting ...	Crosses Godaveri ...	...	...	...	...	...	...
27th "	Bijghur ...	...	...	...	...	...	...	Harcourt sent to Ganjma.
28th "	Luchapore ...	Jalgaon ...	...	...	...	...	...	Detachment embarks at Calcutta.
29th "	Koll near Alighar, Battle of Koll.	Conference with Col. Lindsay at Aurangabad.	...	...	...	...	Baroach taken after short siege on 29th.	...
30th "	Halt ...	Bulgaon ...	...	...	...	...	...	...
31st "	Halt ...	Baumangaon ...	...	...	...	...	...	...

Date.	Lake.	Wellesley.	Stevenson.	Scindia.	Holkar.	Bhonsla.	Murray.	Harcourt.
1803. 1st Sept. ...	Halting at Koil ...	Susterwari ...	Advance on Jalna ...	.....	.....	.....	.....	.....
2nd .....	Ditto ...	Halt ...	Takes Jalna ...	.....	Camp between Nerbudda and Tapti. ....	.....	.....	.....
4th .....	Aligarh stormed ...	Rackisbaum on Godaveri, ...	.....	.....	.....	.....	.....	.....
5th .....	M'Can sent after Flery and Vandeleur towards Muttra.	Hianapur ...	Marches towards Aurangabad.	.....	.....	.....	.....	.....
6th .....	Powell crosses Jumna near Allahabad with 3,000 men.	Kurka ...	Attacks Scindia's Pandaris at night.	Near Purter, Begum, Sumro and Pholman's Brigade near Adjunta.	.....	Near Purter ...	.....	.....
7th .....	Sonma (Perron surrenders).	Do. ...	.....	Sindkeira ...	.....	Sindkeira ...	.....	.....
8th .....	Kurjah ...	Do. ...	Between Aurangabad and Jalna.	.....	.....	.....	.....	.....
9th .....	Secundera ...	Do. ...	.....	.....	.....	.....	.....	.....
10th .....	Do. ...	.....	.....	.....	.....	.....	.....	.....
21st .....	Purpurgunj (Battle of Dehli.)	Heedgaon ...	.....	.....	Crosses Nerbudda near Myhsar.	North Budnapore	.....	Harcourt at Ganjan.
12th .....	Halt ...	Cavalry Brigade moves to Ranigaon Senta.	.....	.....	.....	.....	.....	3 detachments embarked from Calcutta for Bala-soft.
15th .....	Dehli ...	.....	.....	.....	.....	.....	.....	.....
16th .....	Received by Shah Allum.	.....	.....	.....	.....	.....	Champanur and Dis-reduced.	Manitpatam taken.

Date.	Lake.	Wellesley.	Stevenson.	Scindia.	Holkar.	Bhonsla.	Murray.	Harcourt.
1801.								
17th Sept. ...		Goody on Godaver ...	.....	.....	.....	.....	.....	.....
18th " "		20 miles north on Godaveri Major Hill's convoy arrives.	.....	Dupont's Brigade joins.	Reported mediating invasion by Kasabari Ghat.	.....	Rawanghar taken..	Juggernath occupied.
20th " "		Gola-Pungri (Puna reinforced by 2 battalions.)	.....	.....	.....	.....	.....	.....
21st " "	Appoints Ochterlouy, Resident, Dehli.	Salgaon ..	Salgaon ..	At Jafirabad and Bakerdun.	North of Nerbudda	At Jafirabad and Bakerdun.	.....	Morgans detach- ment lands at Balaore.
22nd " "		.....	.....	.....	.....	.....	.....	.....
23rd " "	Powell on the Kane ...	14 miles from Nulal ...	Marches to Bakerdun	.....	.....	.....	.....	.....
24th " "	Suridabad	Battle of Assaye ...	Assaye ...	Adjunta	.....	Adjunta. Retreat in confusion to Tapti.	.....	Leaves Juggernath for Kuttuk.
25th " "	Seerl ...	Halt ...	.....	Retreat in confusion to the Tapti.	.....	.....	.....	.....
27th " "	Metraul ...	Establishes Hospital at Ajunta	Pursues enemy	.....	.....	.....	.....	.....
29th " "	Hurraul ...	.....	.....	Infantry reach Bah-rampore,	.....	His Bandjarahs desert and sell grain to English.	.....	.....
30th " "	Khusia ...	.....	.....	.....	.....	Cavalry 2 marches West along Tapti.	.....	Scoring occupied.
2nd Oct. ...	Near Muttra	.....	.....	.....	.....	.....	.....	.....
4th " "	Vandeleur and M'Can join.	.....	Junair ...	Cavalry pushes to-wards Kasabari Pass.	.....	.....	.....	.....
5th " "	Before Agra	.....	.....	.....	.....	.....	.....	.....

6th	000000	Wanker! ...	000000	Marches towards Bah- rampore,	000000	000000	000000	000000	000000
7th	000000	Late's operations to 30th August known and private news to 19th September.	000000		000000	000000	000000	000000	000000
8th	000000	Adjunta ...	000000		000000	000000	000000	000000	000000
9th	000000	Governor-General's pro- clamation published.	000000		000000	000000	000000	000000	000000
10th	000000	30 miles north of Au- rangabad.	000000		000000	000000	000000	000000	000000
11th	000000	Phulmor's uncertain ; whether to go towards Stevenson or not.	000000		000000	000000	000000	000000	000000
12th	000000		000000		000000	000000	000000	000000	000000
13th	000000		000000	Takes Bahrampore ; no opposition.	000000	000000	000000	000000	000000
14th	000000	Returns ...	000000		000000	000000	000000	000000	000000
15th	000000	16 North Phulmor!	000000		000000	000000	000000	000000	000000
16th	000000	Palud ...	000000		000000	000000	000000	000000	000000
17th	000000	Adjunta ...	000000	3 miles from Ash- ghar.	000000	000000	000000	000000	000000
18th	000000	Ferdapore ...	000000		000000	000000	000000	000000	000000
19th	000000		000000		000000	000000	000000	000000	000000
20th	000000		000000	Ashghar taken	000000	000000	000000	000000	000000
21st	000000		000000		000000	000000	000000	000000	000000
22nd	000000		000000		000000	000000	000000	000000	000000
23rd	000000	Adjunta (news of Battle of Dehli).	000000		000000	000000	000000	000000	000000
24th	000000		000000		000000	000000	000000	000000	000000
25th	000000		000000		000000	000000	000000	000000	000000
26th	000000		000000		000000	000000	000000	000000	000000
27th	000000	Leaves Agra	000000		000000	000000	000000	000000	000000

Date.	Lake.	Wellcley.	Stevenson.	Scindia.	Holkar.	Bhonsla.	Murray.	Harcourt.
1803.								
28th Oct. ...	Krowli; news of Asa-ye.	Phulmuri						
30th "	West Fatehpore Sekri	Anrangabad		Eadlabad		Lakagaon		
30th "		Nundair	Subsidiary Force leaves Bahrampore for Nagpore.			20 miles from Nandair.		
31st "	Near Kulumbo	Halt		Kulumbo bombarded by Scindia's troops in Hindustan.		Attacks and is repulsed at Umber by Baynes.		
1st Nov. ...	Battle of Laswari	Chinkak				Retreats North-East.		
6th "		Chittholi		Sends Vikil to Wellcley.				
8th "	Leaves Laswari							
9th "	Katumbo	Jam				Leaves through Wasinghat.		
10th "	Do.							
11th "	Nandbal			Vikil at Jam				
12th "								
13th "	Palashur							
16th "	Do.	Tulay						
17th "	Do.	Oowad						
18th "	Do.	Pipalnair						
19th "	Do.	Wautud		Suspension of arms concluded with Scindia only.				

1st	Do.	Nowli	Bailapore	Serowili	Near Argaum
2nd	Do.	Ecaumba			
3rd	Do.	Rajoura			
4th	Hears about fall Ail-	Rajoura Chhat			
5th	Hait	Sindheira	Hatti Andora		
6th	Do.	Akola	Hatti Andora		
7th	Do.	Patterley	Patterley		
8th	Do.	Battle of Argaum	Battle of Argaum		
9th	Do.	Patterley	Patterley		
10th	Do.	Akote	Akote		
11th	Do.	Paundry	Paundry		
12th	Powell takes Kalpi	4 miles, West Ellich-	4 miles, West Ellich-		
13th	Halena	pore. Ellichpore (Hospital	pore. Ellichpore, Marches to-		
14th	Kurka	wards Gavilghat.	wards Gavilghat.		
15th	Shepherd's Brigade	Damangaon near	Damangaon near		
16th	John Powell.	Labadia.	Labadia.		
17th	Komadiwah	Battery North Face	Battery North Face		
18th	Ramedah	opened.	Gavilpore stormed		
19th	Mundpore	Deogaum	Ellichpore		
20th	Dewalwarra	Peace negotiation with			
21st	White before Gwallor	Bhosla.			
22nd	Treaty with Bhosla				
23rd	rati- fied.				
24th	Crosses, Wanda; dis-				
25th	mises his troops.				

Date.	Lake.	Wellesley.	Stevenson.	Scindia.	Holkar.	Bhonsla.	Murray.	Harcourt.
1803. 26th Decr. ...	.....	Khan Saman ...	Khan Saman ...	.....	.....	Elphinstone, Resident with Bhonsla, and proceeds to Nagpore.	.....	.....
27th " ...	.....	Surji Anjangaon ...	Surji Anjangaon ...	.....	.....	.....	.....	.....
28th " ...	.....	Peace with Scindia ...	Stevenson goes on sick leave.	Treaty signed Scindia returns to Bahampore with Malcoln.	.....	.....	.....	.....
30th " ...	Colonel Broughton before Sambalpore.	General Campbell defeats 10,000 Pindaris.	.....	.....	.....	.....	.....	.....
31st " ...	.....	Pannorg "	.....	.....	.....	.....	.....	.....

## THE TACTICAL PRINCIPLES AND DETAILS BEST SUITED TO WARFARE ON THE FRONTIERS OF INDIA.

BY LIEUTENANT-COLONEL J. G. RAMSAY, 24TH PUNJAB INFANTRY.

*Motto: "Nec Aspera Terrent."*

*Introduction.*—The tribes on our frontier differ as much in their fighting qualities and armament as do the countries they inhabit in their natural features and climates.

Our attention has of late been directed towards our North-Western Frontier, and the comparatively heavy losses we have suffered there have caused much discussion as to how to conduct frontier expeditions. We say comparatively heavy losses, as they have been heavy compared to what we have been accustomed to of late years; but if we consider the matter, and if we had realised that our opponents, as in the case of the Afridis and Momands, were armed with much the same class of weapons as we are ourselves, we ought to have expected losses quite as great as we have experienced. It has been the custom of the press of late years to raise a howl, and to talk about "disasters," when our losses are more than trifling, but history teaches us that whenever opponents are fairly equally matched as regards weapons, there the losses on both sides are considerable.

In the Sikh Wars, at Ferozshah, Sabraon, Chillianwalla, and Gujrat, our losses were counted by hundreds. In 1857, our losses in action were often very heavy. In 1863, we suffered heavily at the hands of the Bunerwals and Swatis, whose fire-arms were then equal or nearly equal to our own, and who, with their sword-in-hand charges, were able to get in against the slowly loaded muzzle-loader. These same tribesmen, in 1897-98, have failed to make any stand against our breech-loaders, though we must suppose them as brave and fanatical as they were in 1863.

On August 31st and September 1st, 1880, at Kandahar, our losses were considerable.

The Russians, in July 1845, acting against Prince Schamyl, lost 7,000 men and many officers, out of an army of 10,000 men, and had to be extricated from Itchkaria by a force of 6,000 more men.

Therefore, in the Mamund valley, and in Tirah, where we met an enemy armed to a great extent with Sniders, Martini rifles, and some Lee-Netfords, we naturally find our losses increasing. We failed, no doubt, to realize how many rifles were in possession of the tribesmen, and also the fact that we have for many years been supplying the frontier



with trained soldiers; what with pensioners, reservists, and men who have taken their discharge, or have been turned out of our army, there is a goodly number of trained and efficient soldiers all along our frontier, who, one and all, willingly or unwillingly were arrayed against us in the recent outbreaks.

That the Afridis, and other trans-frontier Pathans, are better shots than the other classes of our Native Army is a mistake. They are quicker shots, and better judges of distance; but as regards marksmanship, we do not think they will be found to be any better than the rest of the Native Army.

The Pathan, in his own country, and when firing at his own expense, does not waste ammunition in firing at single men, unless certain of bagging his man; and with breech-loading ammunition at an average price of two rounds for a rupee, it is not to be wondered at; during the Tirah Expedition the price was reduced, by the patriotic manufacturers, to five rounds per rupee. It is hard to understand how, with such costly ammunition, the frontier tribesmen got any practice, but the truth of their success is that they fire into "the brown," and also have marked spots of which they know the range, and any body of men passing such marks are sure to suffer. We remember on the Black Mountain in 1888 several men being hit passing a certain big tree, and the tree was hit once or twice, when the marksman fired too soon or too late.

Again, they take infinite pains in stalking their object, and no detour is too long for them, if they can only accomplish their desire,—a practice learnt from their frequent blood-feuds.

For us, guerilla warfare means petty annoyance, and not operations of a dramatic kind, as are battles, such as at Atbara and Omdurman; but the troops that acquit themselves well in such a campaign, as the recent one in Tirah, are equal to anything that may be required of them elsewhere. "The guerilla mode of warfare must, in fact, be met by an abnormal system of strategy and tactics. The great principle which forms the basis of the Art of War remains—the combination of initiative with energy" (Caldwell's *Small Wars*.)

The Infantry Drill gives us but little help in the matter of what it calls *Savage Warfare*; and though the present edition wisely leaves out any normal form of attack, and only gives us general principles, which apply to every condition of warfare (inasmuch as a firing line, supports, and reserves, followed by successive lines are common to all kinds of fighting), former editions have, by their "attack formations," instilled into the army a stiffness and want of elasticity, which it is very hard to get rid of. Had the "Skirmishing" of older Drill Books been reproduced in the present one, we think it would have been highly advantageous; a skirmishing line can easily be made into an attacking line, but not so easily an attacking line into a skirmishing one.

General Bugeaud's instructions to his Lieutenants, when he took over command in Algeria against Abd-el-Kadir "*Vous aurez beaucoup à oublier*" apply to our Frontier Warfare, though we have as well much to remember, and many mistakes and errors would be avoided if we studied more carefully the history of former frontier wars, as

given in such books as Paget and Mason's "A Record of Expeditions against the North-West Frontier tribes."

We propose to consider the subject before us under the following headings:—

1. Forces how best employed.
2. Training of troops for Frontier Warfare.
3. Marches, advanced and rear guards, etc.
4. Reconnaissances.
5. Attack and Defence.
6. Security, out-posts, etc.
7. Signalling.
8. Ambulance.

### 1. FORCES HOW BEST EMPLOYED.

*Forces how best employed.*—"The Theatre of War (Guerilla War) must be sub-divided into sections, each to be dealt with by a given force, or by a given aggregate of separated detachments" (page 111, Caldwell's Small Wars).

General Bugeaud, acting against Abd-el-Kadr in 1841, established very mobile detachments all over the country, which detachments, fully equipped, and with pack transport, were able to raid the Algerians whenever they liked: as Saint Arnand wrote:—"Il se bat quand il veut, il cherche il poursuit l'ennemi, l'inquiète et se fait craindre."

The power of coalition is not great among uncivilised warriors, and a well-equipped brigade of four infantry battalions, a battery, and a squadron of cavalry, where the last can be used, and mounted infantry in a country like Burma, should be able to hold its own anywhere, especially when supported by similar brigades at other points in the country, not far distant. The enemy will be thus kept on the move, and allowed no rest, and a powerful coalition will be impossible.

In countries, like the Assam Hills and Burma, the columns may be smaller still, and the force, when moving in one and the same direction, should be broken up into as small columns as are consistent with safety, and should move by parallel paths.

Baggage must, in all cases, be reduced to a minimum.

On most hill paths and jungle tracks, until improved by working parties, the columns have to move in single file, thus terribly lengthening out the line of march, and continual stoppages will occur, while animals are being got over bad places in the road: the absolute necessity of, at first at all events, advancing with as little impedimenta as possible is thus obvious.

Care must be taken that the various columns are not so far away from one another that the enemy may neglect one or two columns to concentrate all his force against a third.

If possible, the various sections of the enemy should be separately visited and settled with, thus preventing combinations, and the obstinacy in submission that we often meet.

## 2. TRAINING OF TROOPS FOR FRONTIER WARFARE.

*Training.*—"Troops trained for Mountain Warfare will find all other services come easily to them, whereas those that have never quitted the plains will find themselves quite out of their element in the hills; a gradual rational training develops the physique of both men and animals, and preserves them in health and efficiency." (Warfare in mountain countries, translated by Major Simpson, R.A., U. S. Institute of India Journal, October 1892.)

The nature of mountain and jungle warfare—necessitating as it does the action of single companies, half-companies and often sections—throws an amount of responsibility on junior officers and non-commissioned officers, which would not devolve upon them to the same extent elsewhere. The training we must aim at therefore is that which will fit all ranks for this responsibility when it comes.

As regards British troops, the only soldiers who are trained as experts in Hill Warfare are the men of British mountain batteries, who spend half the year in the hills; but besides these, there are a good number of battalions of infantry, or parts of battalions, stationed during the summer months in cantonments and standing camps in the hills, and a good number of weakly men at hill depôts. There is no reason why troops so located in the hills should not be made practically experts in hill and wood fighting.

In many places, such as the Galis and Simla Hills, where there are both mountain batteries and infantry stationed, the training can be made to include combined movements of the two arms. Infantry training must be progressive, and the men must be got into good condition by degrees, by working at hill climbing and cross country movements up and down khuds. Paper-chases for this object make the training more interesting and lively for the men, and time-marches and khud races.

Once the men are fit, manœuvres under service conditions can be carried out—marches, reconnaissance, advanced and rear guards, and attack and defence. Night and day piquet duties, including the advance to take up the position of the piquet, and the retirement from the piquet in the presence of the enemy, and night marches and surprises, including ambuscades to cut off raiding parties, snipers, etc., can all be practised in peace times, and made very interesting to the soldier. Sangars and stockades can also be made and attacked.

The training should commence entirely under company commanders, and be worked up through the battalion to combined manœuvres of several battalions and batteries, where possible, but it is of the greatest importance that company officers should have the training of their own men.

Judging distance and musketry training in the hills are all important, and for battalions in the hills the ordinary annual course should be done away with, and the ammunition expended in firing at objects, whose range has to be practically found out.

The French Alpini battalions carry per company 5 small canvas targets, with poles to fix them up, the targets being 2½ feet high by

1½ feet broad, and two larger targets, 2½ feet high by 6½ feet broad. These are put up at unknown distances, and judged on by sound by the company in the first instance, the markers firing volleys of blank ammunition from the position where the targets are placed; the company then fires several trial volleys, the markers signalling the result; and finally each man fires three rounds independently.

Independent and individual fire should be more practised in the hills, volleys being reserved for longer ranges: in Tirah the enemy were found to hide themselves on hearing the order "present," and on seeing the smoke of the volley, whereas, with well-controlled "independent," the fire can be continuous, which is most essential if the enemy is within effective range, and by it alone a skirmishing enemy can be prevented sneaking from cover to cover.

Individual fire is essential for scouts and skirmishers and very useful in a retirement, when followed up by a scattered enemy.

Field firing in the hills can be made most useful, both as training against an enemy posted in sangars, or occupying woods and jungle. Sudden attacks can be simulated by targets placed in ravines and hidden places, which the force will come upon suddenly.

The weakly men sent to hill depôts can be gradually worked up to a considerable state of efficiency in hill training, though this will be a slower business; but by commencing first without arms, and steadily getting them on to further exertions as their health improves, they will probably by the end of the season be quite fit to take their place with other men trained in the battalions in the hills.

For British and native battalions, not quartered in the hills, camps of exercise in such places as Abbottabad, the low hills near Rawal Pindi and Kalka, Dehra Dun, Cherat, etc., might with advantage be held in the cold weather, and particularly when the battalions quartered in the hills are returning to the plains, when the expense would be trifling.

Every battalion, whether British or native, should, however, have a certain number of trained scouts, at least 10 per company; and these selected men—selected for their activity, intelligence, and marksmanship—should be sent yearly to the hills for a course of training; much can be done in the plains in the way of getting the men fit by running drill, long distance marches, teaching them how or what to observe, etc., but a training in the hills is a necessity to teach them path-finding, wood-fighting, and khud-climbing.

They must be taught that the duties of scouts are not to fight unless detailed for any special object, such as a flank attack, a surprise on a village, an ambuscade to cut off a raiding party, but they must acquire the habit of being able to recognize the lie of hills and the probable position of paths and precipices; they must be able to climb trees so as to get a view over the neighbouring country; and learn to find their way in the dark. Scouts should work in pairs or groups, and should be dressed in loose fitting clothes, especially as to their leg-covering, the French Alpini wear knicker-bockers and putties; they should not have to carry more than 50 rounds of ammunition, and

all straps should be removed from their chests, and the water-bottle and haversack hung from one shoulder straight down, and attached to the belt. They should invariably carry their capes, to put on when halted after a heating climb.

Scouts must be taught the importance of sending back information, whether negative or otherwise; they should be accompanied by signallers. The idea of scouts is not a new one: the Russians have had them for many years, under the name of "Okhotniki"—men chosen for their expertness in hunting, etc., and in Central Asia sent out every year on hunting expeditions.

An officer, signing himself "Bengal Infantry" in a letter recently to the *Pioneer*, quotes an extract from Captain Williams' Historical Account of the Bengal Native Infantry, published in 1817, in which it states that previous to 1801 no effort had been made to adopt a regular system of light infantry in native regiments, though the two flank companies had long been grenadiers. The wars in Europe drew attention to the need of light infantry, and a scheme for native rifle battalions was before the Commander-in-Chief, General Lake, but was put aside in favour of a system introduced by Major-General the Honourable Frederick St. John, then commanding a division of the Bengal Army, of 10 selected and specially trained marksmen per company, who were termed sharpshooters; these sharpshooters remained with their own companies, and were used as an eleventh company when required for any special duty.

The battalions that have done best during the recent frontier troubles have been those fresh from the hills, and it would seem advisable to send the British Regiments first for service to the hills, where they are not only fitter in health for field service, but can acquire a training in hill and jungle warfare, which will make them not only fit for such warfare, but for any other kind of service they may be called upon to undertake.

The clothing of the British soldier might, with great advantage, be made looser all round; and, for service at all events, a loose fitting knicker-bocker introduced in place of the often skin-tight khaki trousers that one sees worn with putties. Capes should be carried in cool climates: many a man goes sick from the result of a chill after getting thoroughly wet through climbing, and then having to sit about.

Officers from battalions not serving in the hills—both from British and native regiments, including native officers—should be sent to attend camps of exercise held in the hills, and, if possible, a senior officer should be told off to see that they understand what is going on as is done at artillery camps of exercise.

In every battalion there are men suited by their tastes and habits for the duties of scouts—men who spend their spare time shooting when they can get any sport, runners, football players, etc. Such men, once taught what to observe and where to look for it, will make most valuable eyes and ears to a force acting in country where mounted troops cannot be employed.

With regard to musketry training of infantry, we should, we think, substitute controlled independent for volley firing at all distances within 500 yards from the enemy's position; whether the fighting be against a civilised or savage foe, the firing within that distance will have to be independent or individual mass firing in future to ensure its being continuous: therefore why not do in peace time what we shall have to do in war?

Once the native army is supplied with smokeless powder, the rapid volleys at 400 and 300 yards will have no *raison d'être*, as independent ensures a continuous rain of missiles, and the firers can take better aim. Again, as far as the individual course goes, all shooting from 300 yards onwards should be quick shooting, the men being taught to bring the rifles to the shoulder and cover the object at once in the same way as shooting with a shot gun. This might be ensured by shooting at such ranges, as 300 and 200 yards only being allowed at a target exposed for a limited period, only two and three seconds, the firer losing his shot if he does not fire within that time. Recruits, in the first instance, might be allowed to fire their rounds in a certain time at a stationary target, the practice being repeated with the disappearing target immediately afterwards.

We have heard a time limit to firing argued against on the principle that men fire too quick on service; but if we train them in peace time to fire quick, they are more likely to fire better when they are firing quickly on service, and a man who takes several seconds to get off one round at 200 yards is not of much use against a charging swordsman or a cavalry soldier.

### 3. MARCHES.

The approaches to the countries on our frontier consist for the most part of narrow, winding paths through jungle, sometimes merely elephant tracks, narrow broken hill paths over kotals, and steep passes, and, what is the most difficult of all, river and torrent beds, passing through deep gorges, and long defiles. The narrowness of the paths usually necessitates an invading force, in the first instance, marching in single file, or at all events their baggage animals moving in single file.

The inability of any country on our frontier to feed an invading force necessitates a very long baggage and supply column; and the constant checks caused by animals throwing their loads, and having to be helped over bad places in the road, cause constant opening out, and consequent lengthening of the column. It follows therefore that the length of marches in such countries must be very much shortened from what is expected of a force acting in the plains, and in a country traversed by good roads: frequent halts, too, must be made for closing the column up, and halts, moreover, must be of sufficient duration to permit of the rearmost animals closing up and getting some breathing time. The duration of halts must therefore be regulated by the length of the column; otherwise the rearmost troops will be constantly on the move.

The pace depends much on the state and training of men and animals, and it should be remembered that down-hill is as hard work as, and harder on loaded animals than, up-hill, and the pace should therefore not be quickened.

As many parallel and converging roads as exist should be used, thus enabling the various columns to be shortened, and to afford each other mutual flanking support.

If, however—as in most cases—the force has to move on one single path, it should be split up into smaller columns, moving complete with their baggage, headed by a general advanced guard, and the whole road flanked, if necessary, while the whole of the échelons are moving along it. The various échelons will then start at such times as will not interfere with one another, and will have their own advanced and rear guards, no échelon being so small that it cannot defend itself entirely if attacked.

Above all, whatever the size of the force, it is of vital importance to keep the whole well connected throughout, and not to allow any one part to become disconnected. From the leading scouts to the flanking piquets and on to the rear guard there must be a thorough connection and possibility of support. The savage warrior knows only too well how to avail himself of every opportunity of cutting in and separating one part of the force from another, and, be he Naga, Burma dacoit, or Afridi, he will prefer to make his attack when he sees the force unduly lengthening out, or one part getting away from the rest.

In a very interesting article by Lord Napier in the XIXth Century for May 1898, comparing the campaign in the Caucasus with the Tirah Expedition, one reads how Prince Schamyl in 1842 and 1845 invariably fell upon the Russian column on the march and in difficult country.

Count Woronoff in 1845, who had been sent to wipe out the disgrace of General Grabbes' defeats in 1841, when the latter lost some 2,000 men and 36 officers, succeeded in getting over the Retschel Pass with considerable loss into Itchkeria, hoping to destroy Prince Schamyl's Capital, Dargo. On this occasion, as soon as the Russians got into the wood, it became alive with mountaineers, who, as the Russian Officers reported, "did not burn much powder, but every shot told." Count Woronoff found Dargo already burnt by Prince Schamyl, and therefore, in hope of inducing the enemy to come in, settled down in the valley of Itchkeria.

On the 10th July he sent half his force, which consisted of 10,000 men, a distance of six miles from his camp towards the Retschel Pass, to bring in a convoy of stores from Gersel. This force was under the command of General Klugenau, and took with it all available transport animals. The enemy did not oppose the force going out, but, when returning with the baggage animals all loaded up, General Klugenau, deceived by the apparent absence of the enemy, allowed the light troops to get too far ahead; the animals too were delayed in getting down from the pass owing to rain having fallen. Schamyl and his "murids" cut in between the advanced guard and the convoy, and at the same time attacked the rear guard, and swept

away the flanking guards; the convoy became disordered, and the guard was driven in upon it. The whole convoy was lost and some 2,000 men and officers.

Had the whole convoy been kept well locked up and connected throughout, such a disaster could not have happened.

Again, quite lately, in Jubaland a party of Sikhs under a native officer was attacked in the jungle by the Ogaden, and owing to their not marching as ordered, with fixed bayonets and locked up, the advanced and rear guards were separated from the main body, and the whole of the party broken up into groups, losing some 31 of their number; whereas, had they kept together, they would have easily beaten off the badly armed enemy.

In jungle fighting the bushman relies on sudden attacks, ambuscades, and in stopping the road with stockades and breast-works. A force can seldom leave the path owing to the denseness of the jungle.

The advanced guard must therefore move with the greatest caution, having a point some distance ahead, composed of specially selected men, fond of hunting if possible; flankers, where they can move, should march within whistle-call on either flank, and a little in advance of the point; they should occasionally make casts across the path, in advance of the point, in order to outflank any possible ambuscades.

The point should march with one or two men well ahead, followed by the remainder of the advanced party: point, flankers, and advanced party should march with bayonets fixed. The main body must protect its own flanks, each company looking out for itself; though, if the jungle is very thick, it may be necessary to station small piquets from the advanced guard, or the head of the column, to protect the line of march, and these will join the rear guard as it comes up.

Should the road be enfiladed, the troops must at once move right and left into the jungle, and endeavour to outflank the enfilading party. Stockades, if met with, must be at once reconnoitred, with a view to their being turned from a flank; if this is impossible, artillery (if with the column) must be brought up to beat down the stockade: but most stockades will be found to be turnable, and the enemy will not wait to have his flank turned.

Once the enemy turns to run, he should be pursued with vigour, but for this purpose infantry will rarely be found fast enough, and mounted infantry should accompany each column if available.

A steady advance will be found to break down any opposition, and it will often be safer to advance, when fired at from a flank, than to halt—the enemy having probably selected that one spot to bring a heavy fire on the passing troops—the troops in rear, who have not come under fire, endeavouring at once to outflank the enemy by a move into the jungle.

Every man should be given a Kookrie or bill-hook to cut away the jungle, for it will often be necessary to clear the path as the force moves on. Men should be taught too to fire from behind the cover



of trees, without exposing themselves, and to remember that the bushman, when armed with a musket, has usually a muzzle-loader, and therefore should not be given time to re-load it.

Baggage should march with the column, and be protected by companies, half-companies, and sections, distributed in closed bodies along its length.

Retirements are not of the same difficult nature as they are in other parts of the frontier. In a jungle a few men can keep off a following enemy, who must get near to be able to use his weapons. The retiring column must in the same way as an advancing one protect itself against ambuscades and surprises; and the whole must be kept connected, and one part not allowed to march away from the other.

In either case all converging paths must be made use of, and the columns kept as small as is compatible with safety.

The countries on our North-West Frontier, though all more or less mountainous, differ in degrees of being so, thus in countries, such as Kurram, Swat, Buner, and Bajour, cavalry can be, and have been, used with very great effect, and the moral influence of cavalry is great.

In such countries, as Tirah, cavalry cannot be used, and it is in such countries that the usefulness of trained scouts—who to a great extent take the place of cavalry and mounted infantry in becoming the eyes and ears of the army—comes in.

The composition of an advanced guard must therefore differ as the nature of the country differs. In such countries, as are suited to cavalry, this arm is of course used to head an advanced guard: where *not* suited, the trained scouts with signallers attached to them must precede the advanced guard, and seek for and find the enemy, sending back news from time to time as to the whereabouts of the enemy or to his not being met with. Once he is met with, the scouts must halt under cover, and await the arrival of the advanced guard.

In every case artillery moves well forward in the column, and if the advanced guard anticipates strong opposition, it may be necessary to attach a battery to the main guard. When the road is commanded by heights, such heights must invariably be crowned: it will seldom occur that crowning parties can move along the crest, and so protect the force, and this duty will usually have to be performed by piquets sent up by the advanced guard, or by a specially detailed force closely following the advanced guard. We think it is more practicable to send the piquets from a specially detailed body as a battalion—or more if necessary, as the advanced guard will then remain intact as it started, and will not have been continually changed during the march. The advanced guard too, on reaching camp, has to provide the piquets for the protection of the camp immediately on arrival.

Again, by detailing a battalion, or battalions, for this duty, the commanders of the same know where their piquets are, and they

themselves are somewhere about ; piquets are therefore less likely to be left behind.

Piquets must have written instructions where to go, and when to retire ; they should join the rear guard on its coming level with them. They must be instructed to advance to their position with the greatest caution, and not to expose themselves on the sky line on arrival ; they must keep a good look out, not only towards the enemy, but also towards the column.

In retiring from their position they will endeavour to keep the enemy in ignorance of their intention as long as possible, retiring by degrees, the fastest movers being left till last. It will sometimes be necessary to leave supports to the piquets, if they are separated from one another by big re-entrants, etc., but usually the main body could support them if necessary.

The distance of the piquets from the column depends on the conformation of the country, and the range of the weapons possessed by the enemy : they must not allow themselves to be commanded, but must command any neighbouring heights ; the hill-man does not like anything above him. Where the tops of the hills are inaccessible, piquets must be dropped along the line of march some way up the slopes to prevent the enemy coming down on the baggage, and such positions taken up whence the summit can be commanded by fire. It is evident that piquetting the heights will take time ; the advanced guard and the piquetting troops must therefore leave camp well before the column has to start, in order that the latter may not be delayed in its march, while the piquets are being put out.

In Pollock's retirement from Afghanistan, in 1841, the heights were crowned and the army suffered no molestation ; Nott and MacGaskill neglected this precaution, and suffered in consequence, losing much of their baggage.

It is, however, in retirement that the hill-man shows the greatest activity, and the very fact of a force retiring is to him a sign of weakness, and he counts it as a victory to himself. If possible, the movements of a force should be so arranged that retirements are unnecessary until the whole country has been subjugated. This cannot, however, always be the case, and where we have to retire it is of the greatest importance that no mistakes should occur, and that the retirement be made as offensive to the enemy as is an advance. The intention and route that is to be followed should be concealed from the enemy as long as possible.

General Tytler retiring from the Bazar Valley on Dakka, in December 1878, being unable to reach the Sisobi Pass, having been delayed in the destruction of the village of Nikai, made for the Taba Pass, where he heard he could encamp and get water ; the opposition was therefore not so great as it would have been had he gone by the pass the enemy expected him by ; and next morning, having piquetted the heights, and directed that the baggage of each corps should march with the corps, with a strong rear guard, he got through

with trained soldiers; what with pensioners, reservists, and men who have taken their discharge, or have been turned out of our army there is a goodly number of trained and efficient soldiers all along our frontier, who, one and all, willingly or unwillingly were arrayed against us in the recent outbreaks.

That the Afridis, and other trans-frontier Pathans, are better shots than the other classes of our Native Army is a mistake. They are quicker shots, and better judges of distance; but as regards marksmanship, we do not think they will be found to be any better than the rest of the Native Army.

The Pathan, in his own country, and when firing at his own expense, does not waste ammunition in firing at single men, unless certain of bagging his man; and with breech-loading ammunition at an average price of two rounds for a rupee, it is not to be wondered at; during the Tirah Expedition the price was reduced, by the patriotic manufacturers, to five rounds per rupee. It is hard to understand how, with such costly ammunition, the frontier tribesmen got any practice; but the truth of their success is that they fire into "the brown," and also into the marked spots of which they know the range, and any body of men passing such marks are sure to suffer. We remember on the Black Mountain in 1888 several men being hit passing a certain big tree, and the tree was hit once or twice, when the marksman fired too soon or too late.

Again, they take infinite pains in stalking their object, and a detour is too long for them, if they can only accomplish their desire — a practice learnt from their frequent blood-feuds.

For us, guerilla warfare means petty annoyance, and not operations of a dramatic kind, as are battles, such as at Atbara and Omdurman; but the troops that acquit themselves well in such a campaign, as the recent one in Tirah, are equal to anything that may be required of them elsewhere. "The guerilla mode of warfare," in fact, is met by an abnormal system of strategy and tactics. The great principle which forms the basis of the Art of War remains — the combination of initiative with energy" (Caldwell's Small Wars.)

The Infantry Drill gives us but little help in the matter of what is called Savage Warfare; and though the present edition wisely leaves out any normal form of attack, and only gives us general principles, which apply to every condition of warfare (inasmuch as a firing line, supports, and reserves, followed by successive lines are common to all forms of fighting), former editions have, by their "attack formations," instilled into the army a stiffness and want of elasticity, which it is very hard to get rid of. Had the "Skirmishing" of older Drill Books been reproduced in the present one, we think it would have been highly advantageous; a skirmishing line can easily be made into an attacking line, but not so easily an attacking line into a skirmishing one.

General Bugeaud's instructions to his Lieutenants, when he took over command in Algeria against Abdel-Kadir "Vous aurez beaucoup à oublier" apply to our Frontier Warfare, though we have as much to remember, and many mistakes and errors would be avoided if we studied more carefully the history of former frontier wars, as

given in such books as Paget and Mason's "A Record of Expeditions against the North-West Frontier tribes."

We propose to consider the subject before us under the following headings:—

1. Forces how best employed.
2. Training of troops for Frontier Warfare.
3. Marches, advanced and rear guards, etc.
4. Reconnaissances.
5. Attack and Defence.
6. Security, out-posts, etc.
7. Signalling.
8. Ambulance.

### 1. FORCES HOW BEST EMPLOYED.

*Forces how best employed.*—"The Theatre of War (Guerilla War) must be sub-divided into sections, each to be dealt with by a given force, or by a given aggregate of separated detachments" (page 111, Caldwell's Small Wars).

General Bugeaud, acting against Abd-el-Kadr in 1841, established very mobile detachments all over the country, which detachments, fully equipped, and with pack transport, were able to raid the Algerians whenever they liked: as Saint Armand wrote:—"Il se bat quand il veut, il cherche il poursuit l'ennemi, l'inquiète et se fait craindre."

The power of coalition is not great among uncivilised warriors, and a well-equipped brigade of four infantry battalions, a battery, and a squadron of cavalry, where the last can be used, and mounted infantry in a country like Burma, should be able to hold its own anywhere, especially when supported by similar brigades at other points in the country, not far distant. The enemy will be thus kept on the move, and allowed no rest, and a powerful coalition will be impossible.

In countries, like the Assam Hills and Burma, the columns may be smaller still, and the force, when moving in one and the same direction, should be broken up into as small columns as are consistent with safety, and should move by parallel paths.

Baggage must, in all cases, be reduced to a minimum.

On most hill paths and jungle tracks, until improved by working parties, the columns have to move in single file, thus terribly lengthening out the line of march, and continual stoppages will occur, while animals are being got over bad places in the road: the absolute necessity of, at first at all events, advancing with as little impedimenta as possible is thus obvious.

Care must be taken that the various columns are not so far away from one another that the enemy may neglect one or two columns to concentrate all his force against a third.

If possible, the various sections of the enemy should be separately visited and settled with, thus preventing combinations, and the obstinacy in submission that we often meet.

## 2. TRAINING OF TROOPS FOR FRONTIER WARFARE.

*Training.*—"Troops trained for Mountain Warfare will find all other services come easily to them, whereas those that have never quitted the plains will find themselves quite out of their element in the hills; a gradual rational training develops the physique of both men and animals, and preserves them in health and efficiency." (Warfare in mountain countries, translated by Major Simpson, R.A., U. S. Institute of India Journal, October 1892.)

The nature of mountain and jungle warfare—necessitating as it does the action of single companies, half-companies and often sections—throws an amount of responsibility on junior officers and non-commissioned officers, which would not devolve upon them to the same extent elsewhere. The training we must aim at therefore is that which will fit all ranks for this responsibility when it comes.

As regards British troops, the only soldiers who are trained as experts in Hill Warfare are the men of British mountain batteries, who spend half the year in the hills; but besides these, there are a good number of battalions of infantry, or parts of battalions, stationed during the summer months in cantonments and standing camps in the hills, and a good number of weakly men at hill depôts. There is no reason why troops so located in the hills should not be made practically experts in hill and wood fighting.

In many places, such as the Galis and Simla Hills, where there are both mountain batteries and infantry stationed, the training can be made to include combined movements of the two arms. Infantry training must be progressive, and the men must be got into good condition by degrees, by working at hill climbing and cross country movements up and down khuds. Paper-chases for this object make the training more interesting and lively for the men, and time-marches and khud races.

Once the men are fit, manœuvres under service conditions can be carried out—marches, reconnaissance, advanced and rear guards, and attack and defence. Night and day piquet duties, including the advance to take up the position of the piquet, and the retirement from the piquet in the presence of the enemy, and night marches and surprises, including ambuscades to cut off raiding parties, snipers, etc., can all be practised in peace times, and made very interesting to the soldier. Sangars and stockades can also be made and attacked.

The training should commence entirely under company commanders, and be worked up through the battalion to combined manœuvres of several battalions and batteries, where possible, but it is of the greatest importance that company officers should have the training of their own men.

Judging distance and musketry training in the hills are all important, and for battalions in the hills the ordinary annual course should be done away with, and the ammunition expended in firing at objects, whose range has to be practically found out.

The French Alpini battalions carry per company 5 small canvas targets, with poles to fix them up, the targets being 2½ feet high by

1½ feet broad, and two larger targets, 2½ feet high by 6½ feet broad. These are put up at unknown distances, and judged on by sound by the company in the first instance, the markers firing volleys of blank ammunition from the position where the targets are placed; the company then fires several trial volleys, the markers signalling the result; and finally each man fires three rounds independently.

Independent and individual fire should be more practised in the hills, volleys being reserved for longer ranges: in Tirah the enemy were found to hide themselves on hearing the order "present," and on seeing the smoke of the volley, whereas, with well-controlled "independent," the fire can be continuous, which is most essential if the enemy is within effective range, and by it alone a skirmishing enemy can be prevented sneaking from cover to cover.

Individual fire is essential for scouts and skirmishers and very useful in a retirement, when followed up by a scattered enemy.

Field firing in the hills can be made most useful, both as training against an enemy posted in sangars, or occupying woods and jungle. Sudden attacks can be simulated by targets placed in ravines and hidden places, which the force will come upon suddenly.

The weakly men sent to hill depôts can be gradually worked up to a considerable state of efficiency in hill training, though this will be a slower business; but by commencing first without arms, and steadily getting them on to further exertions as their health improves, they will probably by the end of the season be quite fit to take their place with other men trained in the battalions in the hills.

For British and native battalions, not quartered in the hills, camps of exercise in such places as Abbottabad, the low hills near Rawal Pindi and Kalka, Dehra Dun, Cherat, etc., might with advantage be held in the cold weather, and particularly when the battalions quartered in the hills are returning to the plains, when the expense would be trifling.

Every battalion, whether British or native, should, however, have a certain number of trained scouts, at least 10 per company; and these selected men—selected for their activity, intelligence, and marksmanship—should be sent yearly to the hills for a course of training; much can be done in the plains in the way of getting the men fit by running drill, long distance marches, teaching them how or what to observe, etc., but a training in the hills is a necessity to teach them path-finding, wood-fighting, and khud-climbing.

They must be taught that the duties of scouts are not to fight unless detailed for any special object, such as a flank attack, a surprise on a village, an ambuscade to cut off a raiding party, but they must acquire the habit of being able to recognize the lie of hills and the probable position of paths and precipices; they must be able to climb trees so as to get a view over the neighbouring country; and learn to find their way in the dark. Scouts should work in pairs or groups, and should be dressed in loose fitting clothes, especially as to their leg-covering, the French Alpini wear knicker-bockers and putties; they should not have to carry more than 50 rounds of ammunition, and

all straps should be removed from their chests, and the water-bottle and haversack hung from one shoulder straight down, and attached to the belt. They should invariably carry their capes, to put on when halted after a heating climb.

Scouts must be taught the importance of sending back information, whether negative or otherwise; they should be accompanied by signallers. The idea of scouts is not a new one: the Russians have had them for many years, under the name of "Okhotniki"—men chosen for their expertness in hunting, etc., and in Central Asia sent out every year on hunting expeditions.

An officer, signing himself "Bengal Infantry" in a letter recently to the *Pioneer*, quotes an extract from Captain Williams' Historical Account of the Bengal Native Infantry, published in 1817, in which it states that previous to 1801 no effort had been made to adopt a regular system of light infantry in native regiments, though the two flank companies had long been grenadiers. The wars in Europe drew attention to the need of light infantry, and a scheme for native rifle battalions was before the Commander-in-Chief, General Lake, but was put aside in favour of a system introduced by Major-General the Honourable Frederick St. John, then commanding a division of the Bengal Army, of 10 selected and specially trained marksmen per company, who were termed sharpshooters; these sharpshooters remained with their own companies, and were used as an eleventh company when required for any special duty.

The battalions that have done best during the recent frontier troubles have been those fresh from the hills, and it would seem advisable to send the British Regiments first for service to the hills, where they are not only fitter in health for field service, but can acquire a training in hill and jungle warfare, which will make them not only fit for such warfare, but for any other kind of service they may be called upon to undertake.

The clothing of the British soldier might, with great advantage, be made looser all round; and, for service at all events, a loose fitting knicker-bocker introduced in place of the often skin-tight khaki trousers that one sees worn with putties. Capes should be carried in cool climates: many a man goes sick from the result of a chill after getting thoroughly wet through climbing, and then having to sit about.

Officers from battalions not serving in the hills—both from British and native regiments, including native officers—should be sent to attend camps of exercise held in the hills, and, if possible, a senior officer should be told off to see that they understand what is going on as is done at artillery camps of exercise.

In every battalion there are men suited by their tastes and habits for the duties of scouts—men who spend their spare time shooting when they can get any sport, runners, football players, etc. Such men, once taught what to observe and where to look for it, will make most valuable eyes and ears to a force acting in country where mounted troops cannot be employed.

With regard to musketry training of infantry, we should, we think, substitute controlled independent for volley firing at all distances within 500 yards from the enemy's position; whether the fighting be against a civilised or savage foe, the firing within that distance will have to be independent or individual mass firing in future to ensure its being continuous: therefore why not do in peace time what we shall have to do in war?

Once the native army is supplied with smokeless powder, the rapid volleys at 400 and 300 yards will have no *raison d'être*, as independent ensures a continuous rain of missiles, and the firers can take better aim. Again, as far as the individual course goes, all shooting from 300 yards onwards should be quick shooting, the men being taught to bring the rifles to the shoulder and cover the object at once in the same way as shooting with a shot gun. This might be ensured by shooting at such ranges, as 300 and 200 yards only being allowed at a target exposed for a limited period, only two and three seconds, the firer losing his shot if he does not fire within that time. Recruits, in the first instance, might be allowed to fire their rounds in a certain time at a stationary target, the practice being repeated with the disappearing target immediately afterwards.

We have heard a time limit to firing argued against on the principle that men fire too quick on service; but if we train them in peace time to fire quick, they are more likely to fire better when they are firing quickly on service, and a man who takes several seconds to get off one round at 200 yards is not of much use against a charging swordsman or a cavalry soldier.

### 3. MARCHES.

The approaches to the countries on our frontier consist for the most part of narrow, winding paths through jungle, sometimes merely elephant tracks, narrow broken hill paths over kotals, and steep passes, and, what is the most difficult of all, river and torrent beds, passing through deep gorges, and long defiles. The narrowness of the paths usually necessitates an invading force, in the first instance, marching in single file, or at all events their baggage animals moving in single file.

The inability of any country on our frontier to feed an invading force necessitates a very long baggage and supply column; and the constant checks caused by animals throwing their loads, and having to be helped over bad places in the road, cause constant opening out, and consequent lengthening of the column. It follows therefore that the length of marches in such countries must be very much shortened from what is expected of a force acting in the plains, and in a country traversed by good roads: frequent halts, too, must be made for closing the column up, and halts, moreover, must be of sufficient duration to permit of the rearmost animals closing up and getting some breathing time. The duration of halts must therefore be regulated by the length of the column; otherwise the rearmost troops will be constantly on the move.



The pace depends much on the state and training of men and animals, and it should be remembered that down-hill is as hard work as, and harder on loaded animals than, up-hill, and the pace should therefore not be quickened.

As many parallel and converging roads as exist should be used, thus enabling the various columns to be shortened, and to afford each other mutual flanking support.

If, however—as in most cases—the force has to move on one single path, it should be split up into smaller columns, moving complete with their baggage, headed by a general advanced guard, and the whole road flanked, if necessary, while the whole of the *échelons* are moving along it. The various *échelons* will then start at such times as will not interfere with one another, and will have their own advanced and rear guards, no *échelon* being so small that it cannot defend itself entirely if attacked.

Above all, whatever the size of the force, it is of vital importance to keep the whole well connected throughout, and not to allow any one part to become disconnected. From the leading scouts to the flanking piquets and on to the rear guard there must be a thorough connection and possibility of support. The savage warrior knows only too well how to avail himself of every opportunity of cutting in and separating one part of the force from another, and, be he Naga, Burma dacoit, or Afridi, he will prefer to make his attack when he sees the force unduly lengthening out, or one part getting away from the rest.

In a very interesting article by Lord Napier in the XIXth Century for May 1898, comparing the campaign in the Caucasus with the Tirah Expedition, one reads how Prince Schamyl in 1842 and 1845 invariably fell upon the Russian column on the march and in difficult country.

Count Woronsoff in 1845, who had been sent to wipe out the disgrace of General Grabbes' defeats in 1841, when the latter lost some 2,000 men and 36 officers, succeeded in getting over the Retschel Pass with considerable loss into Itchkeria, hoping to destroy Prince Schamyl's Capital, Dargo. On this occasion, as soon as the Russians got into the wood, it became alive with mountaineers, who, as the Russian Officers reported, "did not burn much powder, but every shot told." Count Woronsoff found Dargo already burnt by Prince Schamyl, and therefore, in hope of inducing the enemy to come in, settled down in the valley of Itchkeria.

On the 10th July he sent half his force, which consisted of 10,000 men, a distance of six miles from his camp towards the Retschel Pass, to bring in a convoy of stores from Gersel. This force was under the command of General Klugenau, and took with it all available transport animals. The enemy did not oppose the force going out, but, when returning with the baggage animals all loaded up, General Klugenau, deceived by the apparent absence of the enemy, allowed the light troops to get too far ahead; the animals too were delayed in getting down from the pass owing to rain having fallen. Schamyl and his "murids" cut in between the advanced guard and the convoy, and at the same time attacked the rear guard, and swept

away the flanking guards; the convoy became disordered, and the guard was driven in upon it. The whole convoy was lost and some 2,000 men and officers.

Had the whole convoy been kept well locked up and connected throughout, such a disaster could not have happened.

Again, quite lately, in Jubaland a party of Sikhs under a native officer was attacked in the jungle by the Ogaden, and owing to their not marching as ordered, with fixed bayonets and locked up, the advanced and rear guards were separated from the main body, and the whole of the party broken up into groups, losing some 31 of their number; whereas, had they kept together, they would have easily beaten off the badly armed enemy.

In jungle fighting the bushman relies on sudden attacks, ambuscades, and in stopping the road with stockades and breast-works. A force can seldom leave the path owing to the denseness of the jungle.

The advanced guard must therefore move with the greatest caution, having a point some distance ahead, composed of specially selected men, fond of hunting if possible; flankers, where they can move, should march within whistle-call on either flank, and a little in advance of the point; they should occasionally make casts across the path, in advance of the point, in order to outflank any possible ambuscades.

The point should march with one or two men well ahead, followed by the remainder of the advanced party: point, flankers, and advanced party should march with bayonets fixed. The main body must protect its own flanks, each company looking out for itself; though, if the jungle is very thick, it may be necessary to station small piquets from the advanced guard, or the head of the column, to protect the line of march, and these will join the rear guard as it comes up.

Should the road be enfiladed, the troops must at once move right and left into the jungle, and endeavour to outflank the enfilading party. Stockades, if met with, must be at once reconnoitred, with a view to their being turned from a flank; if this is impossible, artillery (if with the column) must be brought up to beat down the stockade: but most stockades will be found to be turnable, and the enemy will not wait to have his flank turned.

Once the enemy turns to run, he should be pursued with vigour, but for this purpose infantry will rarely be found fast enough, and mounted infantry should accompany each column if available.

A steady advance will be found to break down any opposition, and it will often be safer to advance, when fired at from a flank, than to halt—the enemy having probably selected that one spot to bring a heavy fire on the passing troops—the troops in rear, who have not come under fire, endeavouring at once to outflank the enemy by a move into the jungle.

Every man should be given a Kookrie or bill-hook to cut away the jungle, for it will often be necessary to clear the path as the force moves on. Men should be taught too to fire from behind the cover

of trees, without exposing themselves, and to remember that the bushman, when armed with a musket, has usually a muzzle-loader, and therefore should not be given time to re-load it.

Baggage should march with the column, and be protected by companies, half-companies, and sections, distributed in closed bodies along its length.

Retirements are not of the same difficult nature as they are in other parts of the frontier. In a jungle a few men can keep off a following enemy, who must get near to be able to use his weapons. The retiring column must in the same way as an advancing one protect itself against ambuscades and surprises; and the whole must be kept connected, and one part not allowed to march away from the other.

In either case all converging paths must be made use of, and the columns kept as small as is compatible with safety.

The countries on our North-West Frontier, though all more or less mountainous, differ in degrees of being so, thus in countries, such as Kurram, Swat, Buner, and Bajour, cavalry can be, and have been, used with very great effect, and the moral influence of cavalry is great.

In such countries, as Tirah, cavalry cannot be used, and it is in such countries that the usefulness of trained scouts—who to a great extent take the place of cavalry and mounted infantry in becoming the eyes and ears of the army—comes in.

The composition of an advanced guard must therefore differ as the nature of the country differs. In such countries, as are suited to cavalry, this arm is of course used to head an advanced guard: where *not* suited, the trained scouts with signallers attached to them must precede the advanced guard, and seek for and find the enemy, sending back news from time to time as to the whereabouts of the enemy or to his not being met with. Once he is met with, the scouts must halt under cover, and await the arrival of the advanced guard.

In every case artillery moves well forward in the column, and if the advanced guard anticipates strong opposition, it may be necessary to attach a battery to the main guard. When the road is commanded by heights, such heights must invariably be crowned: it will seldom occur that crowning parties can move along the crest, and so protect the force, and this duty will usually have to be performed by piquets sent up by the advanced guard, or by a specially detailed force closely following the advanced guard. We think it is more practicable to send the piquets from a specially detailed body as a battalion—or more if necessary, as the advanced guard will then remain intact as it started, and will not have been continually changed during the march. The advanced guard too, on reaching camp, has to provide the piquets for the protection of the camp immediately on arrival.

Again, by detailing a battalion, or battalions, for this duty, the commanders of the same know where their piquets are, and they

themselves are somewhere about ; piquets are therefore less likely to be left behind.

Piquets must have written instructions where to go, and when to retire ; they should join the rear guard on its coming level with them. They must be instructed to advance to their position with the greatest caution, and not to expose themselves on the sky line on arrival ; they must keep a good look out, not only towards the enemy, but also towards the column.

In retiring from their position they will endeavour to keep the enemy in ignorance of their intention as long as possible, retiring by degrees, the fastest movers being left till last. It will sometimes be necessary to leave supports to the piquets, if they are separated from one another by big re-entrants, etc., but usually the main body could support them if necessary.

The distance of the piquets from the column depends on the conformation of the country, and the range of the weapons possessed by the enemy : they must not allow themselves to be commanded, but must command any neighbouring heights ; the hill-man does not like anything above him. Where the tops of the hills are inaccessible, piquets must be dropped along the line of march some way up the slopes to prevent the enemy coming down on the baggage, and such positions taken up whence the summit can be commanded by fire. It is evident that piquetting the heights will take time ; the advanced guard and the piquetting troops must therefore leave camp well before the column has to start, in order that the latter may not be delayed in its march, while the piquets are being put out.

In Pollock's retirement from Afghanistan, in 1841, the heights were crowned and the army suffered no molestation ; Nott and MacGaskill neglected this precaution, and suffered in consequence, losing much of their baggage.

It is, however, in retirement that the hill-man shows the greatest activity, and the very fact of a force retiring is to him a sign of weakness, and he counts it as a victory to himself. If possible, the movements of a force should be so arranged that retirements are unnecessary until the whole country has been subjugated. This cannot, however, always be the case, and where we have to retire it is of the greatest importance that no mistakes should occur, and that the retirement be made as offensive to the enemy as is an advance. The intention and route that is to be followed should be concealed from the enemy as long as possible.

General Tytler retiring from the Bazar Valley on Dakka, in December 1878, being unable to reach the Sisobi Pass, having been delayed in the destruction of the village of Nikai, made for the Taba Pass, where he heard he could encamp and get water ; the opposition was therefore not so great as it would have been had he gone by the pass the enemy expected him by ; and next morning, having piquetted the heights, and directed that the baggage of each corps should march with the corps, with a strong rear guard, he got through

with little loss, though the country was heavily wooded, and cut up with deep ravines and gullies, and was, moreover, quite unknown.

The route along which the retirement is to be made must be piqueted by the main body, such piquets joining the rear guard as it comes up; the rear guard thus becoming stronger as the retirement progresses. All baggage should be sent off ahead of the main body with its own advanced and rear guard, the main body following and keeping connection with the rear guard of the force: it must regulate its pace by that of the rear guard—the latter being careful at the same time not to delay longer than it can help. It is of the greatest importance that no opportunity be given to the enemy to cut in between any part of the retiring force.

Retirements should not be long marches, and they should be so timed that the rear guard can reach camp well before dark; should the rear guard or any portion of it be benighted, it is better to seize a village or some commanding spot, and entrench for the night, than to stumble on with an enemy hanging round, who can see twice as well as we can in the dark, and knows every fold in the country.

The main body must leave parties to hold any bad defiles, passes, etc., on the route, and must also send word back of any rice-field or marshy ground where the troops may be bogged, at the same time leaving men to point out the best paths. Fords over rivers will, in like manner, be marked for the following troops.

The greatest care must be taken that none of the flanking piquets are left behind; they must be given written orders as to when they are to come down; and they must get into signalling connection with the rear guard. No men, not absolutely fit, should ever be allowed to be with a rear guard, if fighting is expected. Ammunition mules, entrenching tools, etc., should precede the main guard of the rear guard, all men on the rear guard carrying their cooked rations and as much ammunition as they can manage so as to be, as far as possible, independent of the ammunition mules.

The main body must be ready to reinforce the rear guard if necessary. If hard pressed, the rear guard must retire by degrees, deceiving the enemy as long as possible, the swiftest runners, such as trained scouts, being left to the last, and when the parties behind them have got into position, retiring without firing as fast as they can.

The supports and reserves will often have to let the firing line pass through them, taking their turn as firing line, while the original firing line becomes the support; but the important point is that the parties actually retiring must be covered by the fire of troops in the rear, and when the enemy exposes himself the fire must be continuous.

Should casualties occur in the firing line, they must be quickly carried in by as few men as possible, lest a target be made for the enemy; a halt must be made, and at times it may be necessary to make a counter-attack to enable the carrying party to get away safely.

Rifles and accoutrements of casualties must be at once collected and not allowed to fall into the enemy's hands.

Lieutenant-Colonel Pollock, in his notes on Hill Warfare, *Journal of the United Service Institute, India*, April 1893, quotes the following instances of successful rear guard actions, which well illustrate what is required:—During the Jowaki Expedition, 1878, Major McQueen, Commanding 5th Punjab Infantry, was ordered to cover the retirement of a force from the heights above Ghariba: he detailed the Pathan Company of the 5th Punjab Infantry to cover the final retirement; this company retired gradually, leaving the most active men to the last, who in their turn retired at speed, covered by the fire of men posted below. Major Hammond, V.C., of the Guides, in retiring from the Asmai Heights in 1879 in like manner hung on to the crest with twelve men till the enemy was close upon him, when the party retired as fast as it could.

An instance of a well conducted rear guard action is that, before quoted, of General Tytler's retirement on Dakha *viz* the Tabai Pass. Also his retirement from the reconnaissance of the Bokar Pass in Bazar Valley in February 1879. The Bokar Pass leads into the Bara Valley, and the enemy collected in strength to oppose our progress. When General Tytler had seen all he wanted, the retirement was ordered: the right flank was commanded by hills and spurs, running down into the valley; these hills were piquetted, and the force retired in extended lines, one line passing through another. The artillery covered the withdrawal of the piquets from the hills. Though the enemy followed up the force vigorously for some distance, the casualties on our side were only some three wounded.

*Convoys, etc.*—Convoys should be marched on the same principles as for any other force, but the piquetting of the heights should be done from the starting point and from the point of destination for the day—each post taking half-way. The escort should be kept together at the head, centre, and rear of the convoy, and need not be very large if the heights are sufficiently piquetted. The baggage guard should be separate from the escort, and should be detailed from the corps and departments, whose baggage and stores are being conveyed. The baggage guard must be responsible for loading up, seeing that the girths are tightened after starting, unloading, if necessary, at a prolonged halt, re-loading animals that have thrown their loads, and helping their loaded animals over bad places. The mules must never be attached to one another on bad and narrow roads, and ammunition must be so loaded that the boxes can be opened without undoing the loading ropes.

Foraging parties, in the same way, must take care that all commanding heights are piquetted, and any pass or bad part of the road over which they have to return held till their return. Once the animals are loaded up, they should be sent off to camp with a small advanced and rear guard, the escort following them with all the precautions of a rear guard in a retirement. The officer in command should make certain of returning to camp before dark: no straggling should be permitted from the villages from which the forage is ordered to be obtained.

A force sent out to punish any particular section or village should make sure of its retirement by posting part of the force to cover the remainder. The march should be so timed that the whole force shall be back before dark, and it is better to bivouac for the night near the place, and employ the early morning of the next day in destroying the village, etc., than to risk getting caught in the dark, by trying to do too much in one day. Any commanding heights near the villages must of course be held till the villages have been fired. The various houses should be first all prepared for firing, and fired at the last moment, when everything is ready for the retirement, lest the smoke obscure the view of the piquets, and they miss their way.

No straggling should be allowed from the line of march, followers in particular giving much trouble in this way. On the march from Kabul to Kandahar in August 1880, the hardest duty of the rear guard was to drive on the followers, who hid themselves wherever they could; and the rear guard had to scour the precincts of the camp, to find them, before starting off. Men should never be allowed to fall out singly for purposes of nature. During the first march towards Kandahar from Ghazni, one regiment lost two men in this way.

When a force, whatever its size, halts in jungle or in hills, small picquets should be at once posted, if not already out, to prevent any sudden attack, or any of the enemy's sharpshooters, who may be lurking near, from firing into the camp.

Artillery with a rear guard should march in advance of the main guard or reserve.

Night marches in the hills are very difficult and dangerous, though

Night marches.

at times they may be necessary to seize a pass, surprise a village, or for any such

important service.

We have examples of successful night marches in the hills as follows:—

Lord Roberts' flank attack on the Peiwar Kotal, 1878, which, however, was a very hazardous undertaking.

Colonel Gawler's night march on Sandoopchi, Sikkim.

Colonel Moseley's successful seizure of Ali Masjid, 1841.

Ochterlony's night march in Nepal through the ravine called Balakola, and occupation of the Chiraghatti Heights, 1816.

General Chamberlain's abandonment of the Gooroo Mountain, and concentration on the slopes of the Mahaban during the night of November 17th, 1863.

In such operations the greatest caution is necessary; the route should, if possible, be reconnoitred previously, and reliable guides obtained. The force must be kept well together, halts being made every fifteen minutes or so; the pace must necessarily be very slow.

Dark lanterns should be taken and ropes in case men fall over precipices; an absolute silence must be maintained, and no smoking

allowed. The men should be practised in peace times in moving in the hills and jungles in the dark that their eyes may become accustomed to seeing in the dark.

If the force is strongly opposed, it will be better to seize some village or defensible spot, and wait for day-light.

#### 4. RECONNAISSANCE.

This may be divided under three heads—

1. Reconnaissance by selected officers, accompanied by a small escort.
2. Reconnaissance by quick moving troops—cavalry and mounted infantry.
3. Reconnaissance in force.

The first two are dependent on the nature of the country to a great extent, and the first especially on the enterprise and quality of the enemy.

The excellent work done by the Guides Cavalry and 11th Bengal Lancers in Swat, Bajour, and Buner could not have been done in Tirah or Waziristan.

Reconnaissances by individual officers, accompanied by only a small escort, are next to impossible in a country like Tirah, where they are almost certain to be cut off by an ever-watchful enemy. Therefore, in most cases, reconnaissances take the form of reconnaissances in force, and are generally the precursors of a battle, consisting of all arms, where cavalry can be used, and of artillery and infantry, where cavalry cannot move.

The commander must be given explicit instructions as to where he is to go, and how far he is to involve his force in a fight, which depends on the intentions of the commander of the whole force.

If the force is to return by the route by which it goes out, detachments must be left to hold any passes or defiles by which the force will have to return. If it is to return to camp the same day, the baggage will not be great, consisting only of reserve ammunition, water mules, and entrenching tools, in which case the whole force can, in its retirement, act as a rear guard. Rations, however, for two days, or a day and-a-half should be carried on the person, lest the force be delayed, and men should carry their capes; if the climate is cold at night, great-coats on mules must be added to the baggage.

The force must be as mobile as possible, and as many trained scouts as possible should be taken.

Kandahar, August 31st, 1880, is an instance of the difficulty of keeping a force from getting too deeply involved with the enemy. Two brigades were eventually employed in reconnoitring the enemy's position on that day, and, but for evening coming on, the fight of the 1st September would have taken place on the afternoon of the 31st August.



## 5. ATTACK AND DEFENCE.

The tactics of attack differ with the quality, armament, and tactics of the enemy. Skobeleff, writing before the storming of Yangi Kala, 1880-81, says: "The observance of the principle of close formations is the secret of good Asiatic tactics, and will enable us to look forward with confidence to a struggle; however superior the enemy may be in numbers, we shall conquer by close mobile and pliable formations, by careful well-aimed volley firing, and by the bayonet in the hands of men who, by discipline and soldier-like feeling, have been made into an united body."

The above is true enough for the defensive-offensive formations required to meet an enemy like the Dervishes in the Soudan and against tribesmen armed as are the generality of the Swatis, Bajouris, Wazirs, and Bunerwals—fanatics who try to face the breech-loader with the sword and the antiquated match-lock. Against such, we do not require depth of formation, as we do under a wasting rifle fire, but we require as many rifles as possible in the firing line to bring a withering fire to bear on the charge as it starts, and weight to resist it, if it gets home.

Against an enemy like the Afridis, armed to a great extent with rifles, and firing as they do into any collection of men, where they may hope to get a result, an attack must necessarily assume an extended form, capable of being rapidly re-inforced in case the enemy leaves cover to charge down.

We may sometimes deceive the enemy as to our point of attack, as at Malakand, 1895, when the demonstration on the Shakot Pass held a great body of the enemy in front of that pass, while the attack was made on the Malakand. Again, at Sampagha in Tirah, and the Tonga Pass into Buner, the enemy were uncertain as to our actual point of attack. But, as a rule, the choice of the place of attack is denied us, the enemy usually making a stand at some pass or place on the road, where he hopes to be able to resist us.

In jungle warfare the advanced guard suddenly comes upon a stockade or a stockaded village. It is of great importance that the commander at once endeavours to reconnoitre the approaches to such a place, but there must be no hesitation, which would be construed by the bushmen into fear. Most stockaded places are capable of being turned, and if not, are seldom defended equally all round. Few bushmen will stand an approach to their line of retreat. As many approaches as there are should be made use of, the force advancing boldly on the position, while the turning force endeavours to get round the flank; the moment the turning movement begins to be effective, a rapid advance must be made upon the stockade.

If the stockade has to be broken down, the artillery must be employed to do so; and if the flanks cannot be threatened, the attack must be made from the front after an artillery preparation.

The actual storming must be made by the firing line in rank entire, with a support close up to it; the reserve to complete the defeat of the

enemy by an immediate pursuit. Mounted infantry, if available, should accompany the turning movement, and endeavour to get up with the enemy in his retreat. It is of great importance to beat the enemy well, and not allow him to get away unmolested; he must be beaten "by force and through imagination as well." In firing care must be taken not to fire into one's own forces, which the winding paths of a jungle country often make it difficult to avoid.

In a mountainous country the enemy usually takes up a defensive position on a pass or a ridge. The exact position should be ascertained by the advanced scouts of the advanced guard, or possibly still in advance of the advanced guard. The crest and spurs leading from it will in all probability be found to be defended by sangars, out of which the enemy will have to be turned as the advance progresses. The officer in command will have to decide as to artillery preparation for the attack; this is always a difficult matter, as our intention must be to inflict as heavy and crushing a loss on the enemy as possible, which is what he understands by defeat. If the artillery fire commences too early and at too great a distance, the enemy will probably evacuate the position, without coming in contact with the infantry, and get away with little loss.

The Asiatic idea of the power of artillery may be gathered from the tactical instructions of the Bokharan Army; instructions as to the safety of the guns say—"it must be remembered that the strength of one gun is equal to that of a thousand men."

At Dangil Tapa the Tekkes estimated the Russian guns at 100, but Taghma Sirdar, in order to encourage the defenders, persuaded them that there were only 12, but that, being loaded very fast, they appeared more. Skobeleff said: "Victories in Central Asia are bloodless in proportion to the strength of the artillery."

In the affair at Panjpas, in April 1852, 6,000 foot and 80 horse, of the Momand Tribes, were dispersed by the fire of two guns of the 2nd Troop, 1st Brigade, R. H. A., under Sir Colin Campbell, K.C.B. Again, in May 1852, against the Utman Khels, at the village of Prangarh, the artillery under Sir Colin Campbell again did great execution.

In the recent frontier troubles at Sampagha and Tanga Pass the fire of the artillery enabled the infantry to advance with little loss in the first case and none in the second.

The commander of the force has therefore to decide when and where to open his artillery fire; he cannot, however, neglect it on the grounds that he will inflict a heavier loss on the enemy, as he thus takes upon himself the responsibility of perhaps very heavy loss to his own force in the attack.

In most cases the artillery should take up commanding positions at decisive ranges, and fire should not be opened too soon.

The introduction of a mountain howitzer, carrying a heavier shell than our present gun, would be of great advantage to the service; the difficulty of this appears to be the increase to the already long line of mules that would be necessitated by having to carry a heavier shell.

While the artillery are getting into position, the infantry commences its advance to the attack; this advance must be made by converging spurs, re-entrants and water-courses being avoided unless they are held by our own troops on both flanks.

As the infantry advances, the sangars on one spur must be cleared by the fire of the troops on another, from which they will be able to enfilade them; thus the advance is made by the various bodies affording mutual assistance to each other. This was very successfully carried out by the Guides Infantry in their attack on what has since been known as "Guides Hill," on the Malakand, in 1895.

The supports must be close up to the firing line, and must seize every opportunity—and there should be many—to cover the firing line with their fire from commanding points in the rear, thus enabling the firing line to get on without having to stop to fire. The extension of the firing line must depend on the armament and tactics of the enemy; against rifle fire the line must be extended, and in any case crowding must never be allowed.

The lines should be halted and got together some 250 yards from the crest, and bayonets fixed, so as to be ready for a sword-in-hand charge of the enemy; the supports, too, at this period of the fight must look out well, to be able to assist the line in front of them by firing on the enemy as he rises from his cover to the charge. The arrival of the various bodies at the crest must be simultaneous.

With regard to artillery in attack, and in retirements in hill warfare, it is a question whether or not it would be better to separate the guns of a battery up into sections of two guns. In advancing up the spurs of a hill to the attack, this division would have the advantage of being able to move quicker, presenting less of a target to the enemy, and possibly being able to enfilade sangars as it advanced.

Unless the enemy are occupying a strong and sangared position, as at Dargai, the concentration of fire on one place does not seem to be so advantageous as in civilised warfare, where the concentration is originally intended to overcome the artillery strength of the opponents. In retirements, where more than one battery is not available, the separate guns cover each other's retirement in the same way as infantry covers the retirement of other infantry. In the defence of a position, like Malakand, the guns were necessarily divided up, and did very excellent work. On the whole, we incline to the theory that where one battery only is available, it is better to divide it up and to work it with the infantry battalions of the brigade, unless the enemy are occupying any one specially strong position.

In countries on our frontier, such as Swat and Bajour, cavalry are invaluable, and in the recent frontier expeditions we have had numerous instances of their excellent work, *e. g.*—

The pursuit of the enemy at Chakdara by the Guides Cavalry and 11th Bengal Lancers on 2nd August 1897.

The charge of the 13th Bengal Lancers at Shabkadr.

**Captain Cole's brilliant pursuit of the Mamunds, with a squadron of the 11th Bengal Lancers, after the night attack on the camp at Makanrai.**

**The excellent work done by the Guides Cavalry, both mounted and dismounted, in the Mamund Valley.**

**Had the Guides Cavalry not been delayed by the almost impossible road round the flank of the Landakai Hill on 17th August 1897, the defeat of the Swatis and Bunerwals would have been most salutary, as they would have been caught streaming over the plain before they got into the nullahs and to the hills.**

**The moral effect of cavalry too on the frontier tribesman is very great, and this arm should be taken wherever it can be with safety.**

**Surprises, such as those planned and carried out by the late Sir Louis Cavignari on the villages of Sapri in February and Shakot in March 1878, have a very great effect on the Asiatic mind, and may often save the necessity of a larger expedition.**

The defence is a position, with regard to our frontier tribes, which, though we have been compelled at times to assume it, must only be thought of in connection with a vigorous offensive to follow very shortly. The fact of our having to assume the defensive means, to an Asiatic, an acknowledgment of weakness, and any wavering and undecided sections of the enemy are at once encouraged to cast in their lot against us.

**At Ambeyla, in 1863, the necessity of our having to await reinforcements brought down the hitherto undecided Akhund of Swat, with his Swati contingent.**

**Our being shut up in Sherpur in 1879 enabled the enemy to collect enormous forces from all round.**

**The fact of the force on the Malakand being shut up, and of the North Camp having been given up, and the camp burnt by the enemy on the 26th and 27th July 1897, spread like magic through the country, and brought down the people of Bajour, Buner, Utman Khel, and all the neighbouring clans. The shutting up of the troops on Samana raised the spirits of the Orakzais and Afridis.**

**One may dare more against an Asiatic foe than against an European one ; and it is worth the risk to go for a superior force with one inferior in numbers, rather than to be shut up by a rabble that daily increases in numbers. If we have to assume the defensive, the first opportunity must be taken to turn it into a defensive-offensive movement, and frequent and sharp counter-strokes must be made ; in-action against an Asiatic enemy being fatal.**

**Inake recent frontier expeditions the enemy has attempted a somewhat new line of tactics, in the way of vigorous night-attacks, as at Malakand, Chakdara, Nawagai, Makanrai, and Karappa : save at Malakand, on the night of the 26th July, the enemy has not been able to penetrate our defences, and has been beaten off by volley and independent firing.**

Such attacks, if they succeed, should be repulsed by the bayonet, and the bayonet alone, once any of the enemy get inside our position; and the attackers should be followed up at day-break before they have time to get away.

As a general rule, an uncivilised and semi-civilised foe chooses day-break to make his attack, and it is then that we should be very vigilant, and be prepared, not only to repulse the attack, but to follow up the enemy.

Search-lights, if a successful field pattern can be produced, should be of very great value in making night-attacks costly to the enemy. The fire should be kept thoroughly under control; the amount of ammunition wasted on many occasions is quite appalling.

We have a few examples of a defensive-offensive formation, such as that adopted by Sir Herbert Kitchener in the recent fight at Om-durman; Ahmed Khel was something of the same nature, but there was no *sariba*, and the enemy attacked Sir Donald Stewart on the march.

Maiwand should have been an example, but ended in a disaster.

The less we have to do with defensive actions on our frontier the better; when we are forced to cross the border to inflict punishment on any of the border tribes, the defensive must be all on their side—not on ours.

## 6. SECURITY.

Outposts, as understood in civilised warfare, are unsuited to frontier service.

In civilised warfare the opposing forces are often halted in one another's vicinity for some considerable time, and watch each other with their outposts. Such inaction with an uncivilised enemy is exactly what we must avoid; and outposts mean, in such warfare, temporary arrangements to prevent the camp being attacked, if it can't be defended from its own perimeter, and to prevent the camp being harassed by the enemy's distant fire.

Against a civilised enemy—who, like ourselves, has to depend on a base or bases, for his supplies, and who accordingly acts on a certain front, with reference to that—we have usually only to arrange outposts with reference to a certain front, and to watch our flanks with cavalry; but the strength of an uncivilised foe lies in his having no base to bother about, and his power to attack on any front, or all round at once.

The hillman usually comes out to fight provided with a certain number of days' provisions; this he carries himself, and there is no necessity for a long commissariat train; when this store is finished, he re-visits his home or some neighbouring village, and replenishes his stock.

The Afridis in Tirah had, during the recent fighting, their men told off to fight, and others told off to carry provisions for the fighting men—each section of a tribe having to provide a certain number of

each, and certain men being also told off to see that the tale was complete.

The hill and jungle warrior is thus quite unencumbered by bases, convoys, base and expense godowns, and the numerous considerations which make campaigning so difficult for us.

For our encampment we must choose the best site that we can, but this is dependent on several things, the principal of which is proximity to a good water-supply ; firewood and supplies too influence the choice of a camp.

The ideal camp is one so far away from any commanding ground that its defence can be left to the troops occupying it, who, having entrenched themselves, and placed sentries on the perimeter, can rest in comparative security. Such camps were obtainable in some parts of Swat and Bajour ; but in very hilly country it is next to impossible to obtain such sites for camps of any size, and we must accordingly select the best we can.

Whatever sort of camp we have to pitch on, each unit must entrench itself, and this must be done, however late the force gets into camp ; the fact of having an entrenchment, however small, gives the troops a definite line to form on.

Inlying piquets—a section per company at least—must be told off to sleep close up to the entrenchment, and one sentry at least per company posted on the entrenchment perimeter ; supports and reserves must be told off, and every man must know where to go in case of alarm. The encampment, if likely to be stationary, should be further strengthened by *abattis*, wire entanglements, crow's feet, or any other means available. Special protection must be put up to prevent cavalry horses, gun mules and transport being enfiladed by the enemy's fire ; and if no time is available for digging, a certain amount of protection can be obtained from saddles, etc., built up into a "parados."

We think that artillery should be on the perimeter ; the guns can defend their own front, and with a few infantry to repel a determined attack should be quite safe. Cavalry officers prefer to be on the perimeter ; they can then get out of camp with greater ease. Cavalry can spare half its number for the defence of its allotted portion of the perimeters and can be re-inforced by some infantry. The advanced guard of a force, on arriving at the place where it is intended that the force should encamp, should at once detach piquets to hold the approaches, heights, villages, etc., near, and also send a piquet to mount guard over the water-supply. If the country is open, and cavalry and mounted infantry are available, these arms will be used to secure all approaches by posting vedettes. As soon as the rest of the troops have rested and fed, the advanced guard piquets will be relieved, and the night piquets, if the ground requires it, posted under the orders of the field officer of the day, either in the same or in new positions : these piquets must be posted before dark.

In a jungle country the entrenchment will often have to be made of felled trees, commissariat bags, etc. It will probably be found impossible in the time available to clear the jungle round to any extent, and therefore to prevent the enemy annoying the camp by

firing into it from behind trees, etc., or collecting near for a rush, piquets must be posted outside the entrenchment, on approaches and clearings. These piquets should be instructed, if attacked in overwhelming force, to fall back gradually on the entrenchment, sending back word first that they intend doing so. The enemy will not be able to fire into camp from a distance, as in hill warfare, owing to the jungle; and a piquet falling back gradually should be able to keep the enemy from closing on it.

If there are deep nullahs, as at Mankanrai in Bajour, where the enemy may possibly collect, near the site of the camp, the face or faces near such nullahs must detach strong piquets to overlook them, and these faces must be warned on no account to fire: the piquets should be strong enough to hold their own; but if the nullahs are at such a distance that there remains a good field of fire between them and the perimeter, they may be neglected, and the faces concerned trusted to annihilate the enemy, if he attempts to issue from such nullahs.

If the encampment has to be within range of villages and hills these must be piquetted, the distance to which piquets must be sent depending on the range of the enemy's weapons; in Tirah piquets had to be thrown out to 2,000 yards from the camps in many places. All such piquets must be strong enough to hold their own against attack by night, and not be driven in, as were the piquets at Palosin in the Waziristan Expedition of 1860, when the Waziris rushed our camp.

The strength of the piquets will probably be from 20 to 40 men according to the position they are posted in. They should be warned that they can hope for no re-inforcement at night, and must therefore hold out to the last. They should take with them 1st reserve ammunition, water, and entrenching tools, and must at once entrench themselves, or build sangars, further strengthening their piquets by clearing the surroundings, and placing thorns, or any other obstacles available round their posts. Every man must be told off to an alarm post; no sentries should be allowed outside the entrenchment, which should be high enough for men to fire over standing. Should any fold in the ground be unseen from the piquet, a small detached piquet should be placed to overlook it, but on no account a detached *sentry*.

Piquets should be furnished by those faces of the camp in front of which they are posted, in order that there may be no mistake as to not knowing what piquets are in front of any face. If the piquets deny the high ground to the enemy, and any towers and villages whence annoyance can be caused by the enemy firing into camp are also held by small piquets, then the fire of any men who may sneak within the circle of piquets should be practically harmless, as being fired from a lower level, in all probability, than the camp, the bullets should fly over the camp.

Piquets should be relieved at day-break unless the force is moving, in which case they will be withdrawn in fighting formation, covered by the fire of the troops detailed for rear guard.

Should the enemy by any chance effect an entrance into a camp, he must be turned out with the bayonet alone; no firing must ever be allowed with piquets round about the camp.

No patrols should be sent out at night in the hills or jungles, but strong parties may often with advantage be sent up nullahs to surprise raiding parties and to cut off snipers; but in this case the camp and piquets must be warned. Such parties must be of selected men previously trained to move silently in the dark.

## 7. SIGNALLING.

*Signalling.*—With regard to signalling, we would draw attention to the large number of signallers necessary for service on our frontier, especially for expeditions in hill countries.

Each piquet sent to any distance from the main body must be provided with signallers, and when crowning the heights in an advance or in a retirement, many such piquets with signallers will be a necessity. Again, on arrival in camp, both for day and night piquets round the camp, signallers are a necessity.

In action on a hill side signallers are essential for the rapid and correct carrying of orders and intelligence between the firing line and the supreme commander. It will thus be seen that the number of signallers regimentally required is very considerable.

Now, when a battalion goes on service, the first thing that happens to the signallers is that they are taken away from their battalions for brigade and divisional work, and the battalion is left with few or none. This is exceedingly unsatisfactory, as it affects the efficiency of battalions, who thus lose the use of their signallers when most wanted, and also—the signallers of some battalions being better and quicker workers than those of others—the brigade and divisional work is very uneven.

The remedy for this, we think, is the raising of a signalling corps, the signallers being drawn from battalions in peace times, and seconded from their battalions. The corps might be broken up into companies, and the companies attached to various battalions, British and native, the corps being half British, half native, but all taught up to the same standard. Most of the training would naturally be carried on in the hills, and we should then have the double advantage of men trained to work and climb in the hills, and of their being always fit for service.

The battalion signallers would then remain entirely with the battalion, and for regimental work, both for piquet duties, and in the various lines of the fight. Battalions could be called upon, as required, to fill vacancies in the signalling corps.

Signallers in the signalling corps would receive promotion in their own battalion, reverting to it as required by the exigencies of the service.

No staff of officers would be required in peace times, as the companies would be attached to battalions, and be under the regimental instructor of the battalion; in war time the Superintendent and



Assistant Superintendents of Army Signalling would naturally officer the companies of the signalling corps.

### 8. AMBULANCE.

*Ambulance.*—Though not strictly a tactical detail, the question of ambulance so affects our efficiency in the field that it cannot be neglected in considering the details of frontier warfare.

In the first place, the number of field stretchers per battalion of infantry is far too small, and should be increased to two per company; under existing regulations this involves taking 32 men from the ranks, or half a company.

The stretcher bearers forming, with their stretcher, a good target for the enemy, we may expect casualties among them, which will necessitate more men being taken from the ranks, thus still further reducing the fighting efficiency of a battalion.

Again, the men selected for stretcher bearers cannot be spared in peace time to be let off all duties to practice the carrying of stretchers, and they are therefore novices to the work, and can never carry a stretcher as well as a trained and exercised man could. We would propose a bearer battalion in each command of, say, 10 companies of 100 men, in all 1,000 strong, composed of such men as are now found as Kahars in the Punjab Frontier Force regiments, who would probably enlist if sufficient inducements were offered them—such as pay equal to the sepoy's, for stretcher bearers who would run equal risks in action with the sepoy, and who would be the first line of the bearer corps; and for dandy bearers—the second line—a somewhat lower rate, say, Rs. 7 a month, the men being promoted from the lower to the higher rates.

Non-commissioned officers and native officers, if required, could easily be supplied from the regiments of the Indian Army, where there are many men quite fit for such duties, but not up to the present requirements of the service as soldiers. The great desideratum is to get a strong, active stamp of man, who can do the arduous work required, and who, being a permanent servant of Government, can, in peace time, be trained to do what he has to do in war, in place of the miserable specimens of low caste, bad physique men, who are now taken on whenever a campaign is necessary.

The training of such permanent men would include first aid to the wounded, now taught to the bandsmen, and a certain number of men per company in infantry battalions. As a rule, no bands accompany battalions into the field in frontier warfare, so the teaching of bandsmen is of little or no use.

If we allow two stretchers per company on service, a battalion would require—

32 Bearers.

A Brigade,  $32 \times 4 = 128$  bearers.

4 Battalions.

- 2 Field hospitals with 20—  
 dandies each =  $20 \times 4 \times 2 = 160$  bearers  
 per brigade field hospitals,

*i.e.* 288 bearers per brigade.

This is allowing no doolies or dandies per battalion, but having them all with the field hospitals.

A division in the field would thus require a battalion of the bearer corps, of which four battalions from the four commands would be available.

The bearers might further be armed, every second man, with a carbine, and all be taught to fire individual up to 300 yards.

They should be organised in companies, and full companies allotted to various stations, detachments being sent to stations not requiring a full company; the companies might be attached, for discipline, pay, etc., to native battalions.

The men could, besides being drilled and exercised, be employed in carrying sick in cantonments, but not on menial duties. They would be very useful for orderly duties, and would relieve battalions both British and native, of much of this work.

In native hospitals they could be very usefully employed as sick attendants, thus setting free for duty the great number of fighting men now so employed, and on service they would be attached, as far as possible, to the corps with which they had been working.

*In conclusion.*—We cannot make Alpini battalions out of our British battalions in India, the nature of the climate in the plains demanding that battalions be sent to the hills in turn for the health of the men, and short service also militating against such a system.

We have though, in our Gurkha Rifle regiments, corps which can be made into perfect Alpini regiments, and we would rather see these regiments training in the low hills where their cantonments are, in the cold weather, when the furlough men are back, and the battalions are at full strength, than brought down to the plains, as they often are, to make up a camp of exercise over country where they get no experience in the work in which they should be experts. As we have already said, if they are experts in hill and jungle fighting, there is little fear of their not showing up well in any other kind of fighting that may be required of them.

British battalions—if sent to the hills, when on or near the roster for service, or if the scheme of mobilization be so drawn up that battalions which have been some months in the hills are taken first for service on our frontier—will be in a far better state of preparation for the arduous work of frontier fighting.

There is no fear at present of battalions stationed in the hills not being worked over the hills and taught all they can be in peace times, the whole subject being much on the minds of the authorities and commanding officers; but it must be borne in mind that the training, to be of some use, must be essentially a *company* one, in which the non-commissioned officers individually have great attention paid to

them, as on the action of these depends the success—to a very great extent—of any fighting in the hills and jungles.

If the company commander thoroughly understands his work, and imparts instruction of a thoroughly practical character to his subordinates, there is little fear of the battalion going wrong. For those battalions—British and native—who cannot train in the hills, the training must consist in working over as broken and difficult ground as can be found. At most stations, nullahs and deep water-cuttings exist, which can be utilised in training companies in the precautions necessary when moving along such features.

It is very hard, with native troops, to simulate operations in a country different from the country actually before them; there is a great want of imagination in the native soldier; but this drawback is not so much felt with British troops.

A battalion, however, that is taken on service fit, and which has been kept, by judicious training in the plains, hard, will soon be able to move efficiently in hilly country, and will (as it gains experience, and sees battalions that have been previously trained to the work moving in the hills) soon pick up wrinkles as to hill warfare.

Above all, every battalion must shake itself free of the idea, which is very likely to creep in, from service in the plains, that there is but one form of attack, and this can be taught perhaps by concentrating several attacks on one objective, as would be the case in ascending a hill with several spurs.

Scouts, we have pointed out, are just as useful in the plains as in the hills; and although they cannot be taught path-finding, and appreciation of the lie of hills, in the plains, they can be taught to observe, and to report on what they see, and also to move freely in advance of a force.

We would suggest the use of a special flag for signalling to be carried by the signallers attached to the scouts, advanced guard, and rear guard. Say a yellow flag with scouts, and advanced guard, and a red flag with the rear guard. The object of this being to save time as the source from which the message comes will be at once recognised.

It is important that piquets should be able to distinguish the rear guard, and so prevent the possibility of their leaving their positions to join the force before the rear guard comes up, as might be the case if they mistook some other body along the route for the rear guard. With a special flag, as a red one, they would know at once on calling up the rear guard signallers that this was the rear guard, and that they could now retire from their positions.

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## HOW TO LAY OUT AND PITCH A CAMP.

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### GENERAL SERVICE TENTS, 160 LBS.

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To prepare the ground on which a regiment is to encamp in such a way as to ensure that the tents will be pitched without unnecessary delay, perfectly aligned and with the pegs accurately dressed, is not such an easy thing as it might appear to be at first sight. The regulations for encampments in India do not throw much light on the matter. They contain a great deal of information regarding the selection of camping-grounds, weights and dimensions of the different kinds of tents in use, and also give very complete plans of "sealed pattern" camps for the various branches of the service, but they do not state how the intricate ground work of these camps is to be laid out. A young officer entrusted for the first time with this sort of work is often sadly perplexed as to the best way of setting about it, and probably makes many unsuccessful experiments before he satisfies the critical eye of his commanding officer; and it is for his possible enlightenment that these few suggestions are offered. The following method of laying out a camp was employed at some of the recent camps of exercise in the Secunderabad District and was found to work satisfactorily:—

#### *I.—The camp color party.*

Consists generally of the tindal, lascars, store-havildar, and four or five selected men. It should be strong enough to carry the following articles:—

Camp colors.

Cross staff.

One or (if possible) three pegs for each tent.

One or two mallets.

It is not necessary to carry so many pegs if the tents are likely to arrive at the camping-ground an hour or so before the regiment, as often happens at camps of exercise.

The party, under the quarter master, should move off as early as possible and get their work started as soon as they arrive at their destination.

#### *II.—Marking out the camp.*

The "Regulations for encampments" lay down very precise rules as to the distances to be preserved between tents, breadth of roads,

etc., but in nine cases out of ten it will be found impossible to adhere to them. These details depend entirely on the size of the ground and the number of tents to be pitched, and must be decided upon on the spot as soon as the limits of the ground which the regiment is to occupy has been pointed out by the staff officer responsible for that duty.

Plate I shows how to prepare a piece of ground 80 paces broad and 300 paces deep for a regiment of 8 companies, each occupying 6 tents (G. S. 160 lbs.).

These numbers are selected at random to show how the shape of the camp has to be adapted to the ground. Only a portion of the camp is shown.

Point (a) is first selected; it should be on the extreme right of the ground and about 50 paces back from the front edge so as to leave room for a parade ground and for the quarter guard tent.

Plant a flag at (a) and pace to (b) to ascertain the width of the ground. (Note this distance, as it will afterwards be useful in calculating the interval between companies.)

As the ground is deep, the full regulation *distance* (about 10 paces) between tents may be allowed, so the front of the rear line of tents (c)—(d) will be  $(5 \times 10) = 50$  paces back.

Plant the cross staff at (b), cover one pair of sights on (a) and pace to (c), having first, by means of the other pair of sights, ascertained a point in the prolongation of (b)—(c) to march on.

Plant a flag at (c) with the help of an assistant at the cross staff at (b); then replace the cross staff by a flag at (b), set it up again at (c), align it on (b), and note the direction of (d) through the other pair of sights. Pace 80 paces to (d) and mark it by a flag, fixing its position with the cross staff at (c). Have a flag placed at (c), check the distance (d)—(a) which should of course be 50 paces.

Flags should now be placed at (e), (f), (g) and (h), if possible, as in this case, at regulation distances, in the same line as those already fixed.

The next step is to decide on the *intervals* between lines of tents, the width of the centre road, and to drive a peg into the ground to mark where the front standing pole of each tent is to rest.

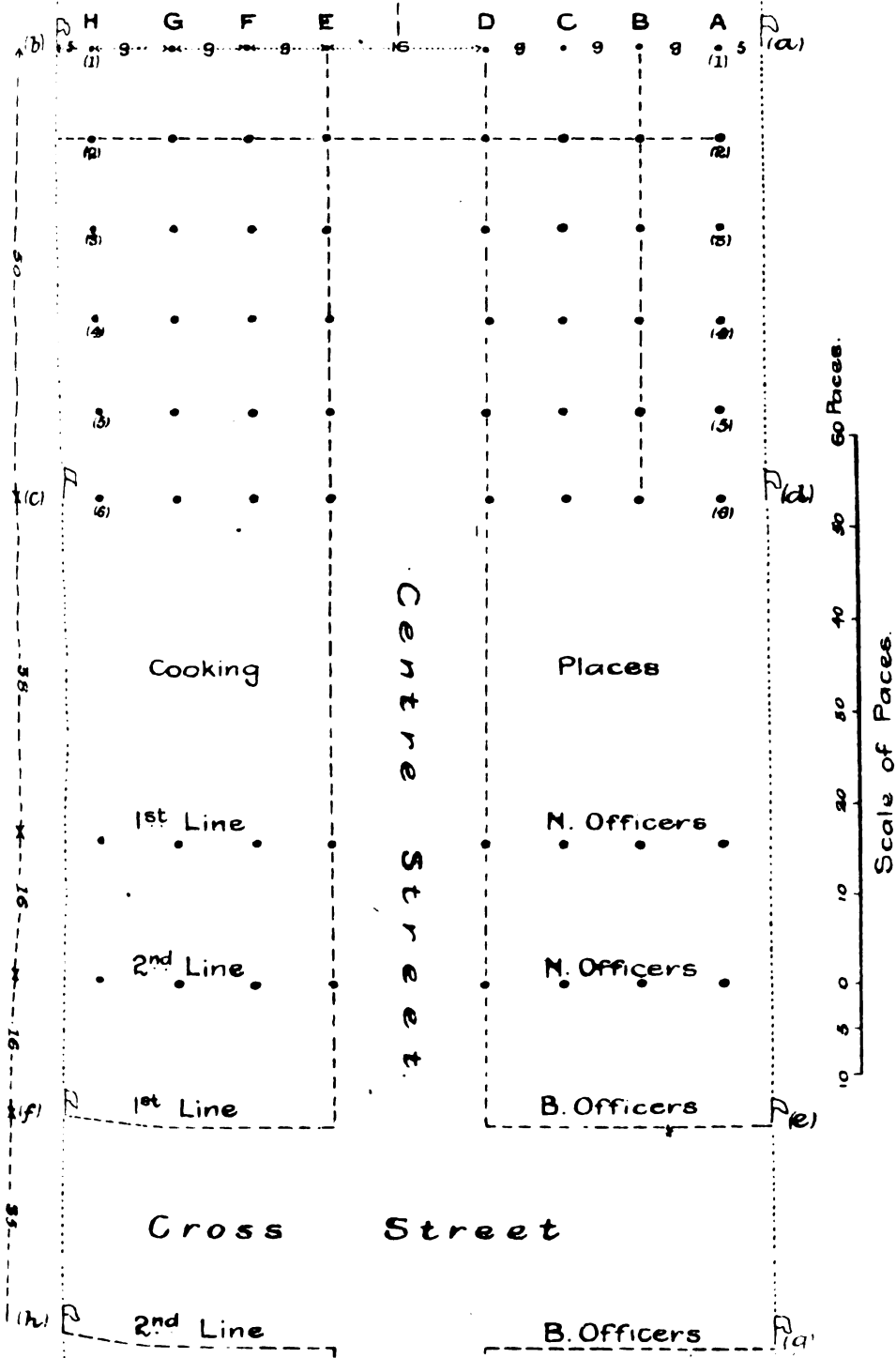
It will be found convenient to always place A (1) and H (1) 5 paces from the flags. This allows room for the tents and a small margin clear along the sides of the ground.

The centre road should be from 15 to 20 paces wide, measured from the front poles of D and E companies, and as the ground is narrow, not more than 16 paces can be allowed for it. This leaves  $(80 - 5 - 5 - 16 =)$  54 paces for the remaining 6 intervals between companies, *i.e.*, 9 paces for each interval.

Drive in the front line of pegs, dressing them between (a) and (b). Then set up the rear line at exactly the same intervals, dressing them between (c) and (d).

# PLATE I.

50 To Qr Gd.  
Tent.



NB Measurements in Paces and from front pole to front



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30

40 Pages.



Next complete the flank companies, driving in pegs at ten paces distance as originally decided on, and dressing them between the front and rear pegs.

No more pacing is now required; the position of the intermediate pegs of the other companies can be determined by "cross-dressing" them between the front and rear pegs, and between the corresponding pegs of the two outer flank companies, *e.g.*—B (2) is fixed by aligning it simultaneously between B (1) and (6) and between A (2) and H (2).

Plate II shows what further steps are necessary to ensure that the side pegs will be dressed without difficulty when the tents are pitched. This part of the work should never be neglected as long as there are materials and time available, as it saves the men a lot of wearying, dressing, and re-dressing of pegs when they come tired into camp, and enables the tents to be got up with no trouble and delay as tidily as the most exacting commanding officer could wish.

A peg is placed on each side of the pegs already driven in at 3 paces distance. These are intended to mark where the front corners of the tents will rest, and they should be *whitewashed*, so as to distinguish them from the front pole pegs; and to ensure that they are not moved later on when the tents are being put up. They serve as markers to dress the other side pegs on. *Those of the front and rear tents of each company should be completed first*; the remainder can be fixed by cross dressing as before.

### III.—Pitching the camp.

Should the baggage arrive before the regiment, the camp color party and baggage guard should unload the tents and lay them down, ready-sorted, on the edge of the ground.

As soon as the regiment arrives, arms will be piled on the parade ground, and parties of 8 men and 1 non-commissioned officer told off for each G. S. tent, a party for the mess tent, and as many men as may be required for officers' tents.

The G. S. tent parties will be taken in in single rank, numbered and told off as follows:—

"Nos. 1, 2, 3, 4, flymen."

"Nos. 5 and 6, standing and ridge poles."

"Nos. 7 and 8, pegs and mallets."

On the command "prepare to pitch tents to your places double march" the numbers will double off with the parts of the tents to which they have been detailed and lay them on the ground in the intervals between companies and to the *right* of the place over which the tent is to be pitched.

The non-commissioned officer and Nos. 7 and 8 will at once drive in two more pegs in line with the corner white pegs and 6 paces from them. (These are for fastening the rear corners of the tent after the order "Raise" has been given); the remaining numbers open out

tent, fix standing and ridge poles in position, fold the fly over them and attach guy ropes. The tent will then be lifted a little to the left and the feet of the standing poles placed exactly over the spot on which they will eventually rest; the front pole close up against the centre peg.

All numbers will then stand in readiness to raise the tents on the bugle sounding; Nos. 7 and 8 lifting the ridge pole up and resting it on their knees; the remainder holding on to the guy ropes.

A native officer in each company will see that all his tents are ready and then report to the officer superintending the pitching of the camp, who will order the "Advance" to be sounded as soon as all companies have been reported ready.

Tents will be raised *from the right* on the last sound of the bugle and the four corners secured; the doors folded back at once to enable the non-commissioned officer to dress his standing poles in line with those of the tent next in rear; Nos. 7 and 8 inside the tent to move the poles as may be required, and *hold them in position while the guy and side ropes are being made fast.*

The men should be trained to work perfectly silently and should never be allowed to stand in the line of pegs and so obstruct the view of those superintending the dressing. Much shouting and confusion will be saved if these two points are attended to.

Pin bags and saleetahs should be kept off the ground on four pegs driven into the ground in the form of a square, one pace in front of the front standing pole.

Two ropes twisted together and stretched between standing poles, a few feet from the ground, will form a good substitute for an arm-rack.

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## SOME FOREIGN ARTICLES OF SPECIAL INTEREST.

(Contributed by the Intelligence Branch.)

### ON THE USE OF BICYCLES IN WAR.

Detachments of bicyclists were first used in the German manœuvres of 1897, when both the West and East armies made use of them. One of these detachments consisting of 100 men taken from the 11th Pioneer battalion and the railway regiments took part in the parade of the XI Corps at Homburg. In addition to these 100 bicyclists, the West army had a detachment of 80, which the 15th Division had raised. Besides smaller detachments, the Bavarians had a well trained bicycle detachment of 10 officers and 100 men which was placed at the disposal of the cavalry division.

There are no reports by experts as to the mode of employment and the results or successes of this new arm in the manœuvres. These lines are written to create interest in the use of bicycles with troops in the field and to find out which bicycles are best adapted for the purpose.

Although the greater number of young officers favour the introduction of the bicycle, the older officers look upon it as an expensive toy.

Next to England, where some volunteer battalions are entirely mounted on bicycles—Germany has made the largest trials of bicyclists at the manœuvres in 1897. In order to judge properly of their employment, the unfavourable circumstances which influenced them must be taken into consideration.

All the bicycle detachments, even the Bavarian which has been longest in existence, have only been raised a short time ago. They were attached to the troops, especially to the cavalry divisions, much later. Although the bicycle corps of the 11th Pioneers was attached to the cavalry division on the 4th February 1897, yet practice with the cavalry did not take place till shortly before the manœuvres. It must not be taken for granted that the higher leaders employed them in the best possible manner. The bicycle corps is still in an experimental stage. The bicycles and equipment and training of the detachments were not only different, but the former were mostly second grade machines and the latter (training) did not come up to a high standard.

In spite of this, the newspapers spoke very favourably of the performances of the detachments. Two riders were even decorated by the Emperor.

Opponents of the bicycle corps maintain that they cannot fight properly in all weathers and at all times of the year, nor in difficult ground, and that they must be looked upon as an impediment to the army, even if their performances are excellent under favourable circumstances. The requirements of a bicycle corps are: they should be riding infantry, and in the fight they should be able to do as much as ordinary infantry of equal numbers, and in all cases where rapidity is required, they should be able to cover three to four times or at least two to three times the distance that ordinary infantry could do in the same time. Should they carry out this, they will have done well. Which bicycle will answer these requirements best? A bicycle for military purposes should be durable and easy running and one that can be used in all weathers and over any ground and should be light enough to be carried easily and conveniently by the rider. This last requirement is especially necessary, for during the fight the bicycle will usually have to be carried. Bicycles should never be left behind during a fight. Opportunities will occur during or after a fight when they will be of great use.

Most of the opponents of the employment of bicyclists as fighting soldiers maintain that a suitable bicycle does not exist. The author of these lines is of opinion that the folding bicycles now in use in France and Austria would answer very well, if we united the advantageous parts in both systems and diminished their faults.

An ordinary bicycle may be ever so light, yet it will never be so convenient to carry about as a folding bicycle which can be fastened on a man's back.

Count Pfeil in the "Allgemeine Militärzeitung" states that the folding bicycle is not suitable for military purposes. An article in N. 51 of the "Militär Wochenblatt" states that the chief fault of the folding bicycle is that no luggage can be carried at the same time. A kit bag of course cannot be carried, but the bicyclist may be able to carry his kit some other way. A bicyclist can never carry the same amount of kit as an ordinary foot soldier. He has to carry his bicycle under certain circumstances, and therefore his kit must be very limited. A military bicyclist will of course carry more than a civilian. A military bicyclist requires his rifle, as much ammunition as possible, a second light coat and short breeches, a change of woollen under-clothing, a light great-coat, a second pair of thin shoes, and perhaps an iron ration and some flat cooking utensils. Bicyclists are more mobile than infantry or cavalry, and should be pushed well to the front, where they will find no difficulties in obtaining shelter and supplies; the latter even from a distance.

In practice, bicycle corps have carried very little luggage; their knapsacks were carried with the regimental baggage, and special arrangements were made as regards the luggage actually carried by the men.

The over-coat, coat, and breeches should be folded flat and carried in a broad water-proof bag.

This is attached to the bicycle frame by means of straps. When the bicycle has to be carried, this bag is first strapped on the back and

then forms a kind of numdah on which the bicycle rests. Everything else, including the ammunition, which the foot soldier carries in the pouch at the back, should be carried in two pouches or bags hanging from the sides. The cooking utensils and the iron ration would generally be left with the regimental baggage. The rifle should of course be attached to the bicycle, muzzle to the front, and the tool bag to the saddle.

It has now been sufficiently well shown that the chief fault of the folding bicycle is not as has been stated that no luggage can be carried in addition to it.

The statement that it would take a long time to strap the luggage and bicycle on the back does not hold good. As a rule, a well-trained detachment can do so in one minute.

The folding bicycle is just as good in every way as an ordinary bicycle. In case a man has to use his rifle in a hurry, he would leave his folding bicycle on the side of the road like any other bicycle until he wanted it again.

The author of the essay in N. 51 states that, when the folding bicycle is carried on the back, the rifle can only be carried in the hand. This does not hold good in regard to the proposed and tested folding bicycle, for the rifle can be carried over the left shoulder and can be slung over the right shoulder.

The "Styria" folding bicycle, model 1897, is a good machine in every respect, but the 26-inch wheels are not necessary; they, however, hardly make any difference in speed. The author, without any special training, rode 90 to 100 km. in 5 hours through very intersected country in Lorraine, and did the same performance in the same time on 28-inch wheels.

Count Pfeil states in his remarks that he has never seen a folding bicycle; his anxiety about it is therefore purely theoretical. He is, however, right in saying that a folding bicycle cannot be as safe and as durable as an ordinary bicycle.

We shall now give a description of the "Styria" military folding bicycle, model 1897.

The folding mechanism is the same as in all other known folding bicycles, such as the cycle pliante of Captain Gérard and the one made by Messrs. Seidel and Naumann. In the "Styria" the front and back wheels are made fast by means of bolts. The bolts are in the middle of both connecting rods and permit of their being pulled out of the hollow part of these rods, and both wheels can be laid on top of each other, covering each other completely. The wheels are then strapped on the back; the wheels projecting a little on the right side; the pedals and cog-wheel projecting on the left side. The saddle and handle bar are about the height of the man's head. Half of the upper connecting rod of the frame is so far over the left shoulder that the rifle can still be carried on it. The wheels, especially if a bag containing clothes is carried on the back, stand out far enough from the right side that the rifle can conveniently be carried over the right shoulder.

A practised rider can fold up his bicycle and strap it on his back in about half a minute ; this includes the removal of the rifle from the bicycle. The weight of this bicycle is  $12\frac{1}{2}$  kg. ( $27\frac{1}{2}$  lbs.) and is lighter than the knapsack when packed for field service.

Some important peculiarities are : one-half of the handle bar can be made to fold up ; a second seat can be attached in rear of the saddle to carry another person ; the two folding parts of the bicycle can be entirely separated, so that two riders can carry a complete bicycle between them.

The last two arrangements are especially important, for wounded riders and their bicycles can thus be carried away. Above all, damaged bicycles can be at once replaced.

Reports on the experiments carried out on this bicycle in the Austrian Army speak very highly of it. A detachment of 24 riders used the older "Styria," model 1896, in the imperial manœuvres in 1896 near Csakathurn, and demonstrated its superiority over all other military bicycles. This detachment rode 2,800 km. (about 1,866 miles) in 6 weeks, sometimes over difficult ground, forests, etc. Lieutenant Czeipek was in command of this detachment and says : " This bicycle was made by Messrs. Puch & Co. in Graze ; it is so solid and firm that one can ride through fields, along paths, and stony ground without any damage to it."

The strengthened pneumatic tyres that are used with this bicycle are very durable. Several firms, including German, such as that of Dürkop, have introduced perfectly puncture-proof pneumatic tyres, more than a year ago. They are proof against nails, pieces of glass, etc. Their price is of course very high.

In one respect the "Gérard" bicycle is superior to the "Styria," *viz.*, in the transmission of power ; the former has no chain, but cog-wheels connected by a rod. Count Pfeil points out the unsuitability of the chain, and every experienced rider has found out its disadvantages at times. The cog-wheels show distinct progress. The author rode an "Acatene" (Greek : without chain) bicycle of the firm Metro-pole in Paris this summer for weeks. He rode from Metz to the Palatinate and the Rhine, and rode up hills 1,300 feet high and even higher without getting off and coasted down these hills at the rate of one kilometre (1,066 yards) in  $1\frac{1}{2}$  to 2 minutes without any damage to the mechanism. This bicycle was  $4\frac{1}{2}$  years old and had been constantly in use and tried a great deal by beginners who cause the most damage to bicycles.

The parts are made of hardened steel and with the accuracy of a watch.

The wearing out at the cog-wheels is insignificantly small.

Experience has shewn that in the course of a whole year the driving gear had to be attended to once ; the ball bearings twice ; cleaning out the covers of the cog-wheels 4 times. The author rode the above Acatene bicycle in heavy rain over a distance of 85 km. (55 miles) over

muddy and wet roads, the machine keeping its easy smooth action the whole time. The author has never heard of a case in which the teeth of the cog-wheels have been known to break.

As all the parts of the driving gear are made mathematically accurate, they are interchangeable, and spare parts can always be carried on the machine. This new method of transmission of power allows of high gearing, which is a very important factor where speed is concerned.

If the cog-wheel system could be applied to the "Styria" folding bicycle, it would undoubtedly become the most suitable bicycle for military purposes, as in the Acatene cog-wheel system there is less friction, less wear, and the driving gear remains much cleaner for a far longer time.

*From the "Militär Wochenblatt."*

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- 1872 .....ROBERTS, Lieut.-Col. F. S., V.C., R.A.  
 1873 .....COLQUHOUN, Capt. J. A. S., R.A.  
 1874 .....COLQUHOUN, Capt. J. A. S., R.A.  
 1879 .....ST. JOHN, Maj. O. B. C., R.E.  
 1880 .....BARROW, Lieut. E. G., S.C.  
 1882 .....MASON, Lieut. A. H., R.E.  
 1883 .....COLLEN, Maj. E. H. H., S.C.  
 1884 .....BARROW, Capt. E. G., S.C.  
 1887 .....YATE, Lieut. A. C., S.C.  
 1888 .....MAUDE, Capt. F. N., R.E.  
                 YOUNG, Maj. G. F., S.C. (specially awarded a silver medal)  
 1889 .....DUFF, Capt. B., S.C.  
 1890 .....MAGUIRE, Capt. C. M., S.C.  
 1891 .....CARDEW, Lieut. F. G., S.C.  
 1893 .....BULLOCK, Maj. G. M., Devon. Regt.  
 1894 .....CARTER, Capt. F. C., Northumberland Fusiliers.  
 1895 .....NEVILLE, Lieut.-Col. J. P. C., S.C.  
 1896 .....BINGLEY, Capt. A. H., S.C.  
 1897 .....NAPIER, Capt. G. S. F., 2nd Bn. Oxfordshire Light Infantry.  
 1898 .....MULLALLY, Maj. H., R.E.  
                 CLAY, Capt. C. H., S.C. (specially awarded a silver medal)  
 1899 .....NEVILLE, Col. J. P. C., S.C.

### MacGregor Memorial Silver Medallists.

- 1889 .....BELL, Col. M. S., V.C., R.E. (specially awarded a gold medal)  
 1890 .....YOUNGHUSBAND, Capt. F. E., K. Dn. Gds.  
 1891 .....SAWYER, Maj. H. A., S.C.  
 1891 .....RAMZAN KHAN, Havildar, 3rd Sikhs.  
 1892 .....VAUGHAN, Capt. H. B., S.C.  
 1892 .....JAGGAT SINGH, Havildar, 10th P. I.  
 1893 .....BOWER, Capt. H., S.C. (specially awarded a gold medal)  
 1893 .....FAZALDAD KHAN, Dafadar, 17th B. C.  
 1894 .....O SULLIVAN, Maj. G. H. W., R.E.  
 1894 .....MULL SINGH, Sowar, 6th B. C.  
 1895 .....DAVIES, Capt., Oxfordshire Light Infantry.  
 1895 .....GUNGA DYAL SINGH, Havildar, 2nd B. I.  
 1896 .....COCKERILL, Lieut. G. K., 28th P. I.  
 1896 .....GHULAM NABI, Private, Q. O. Corps of Guides  
 1897 .....SWAYNE, Capt. E. J. E., 16th B. I.  
 1897 .....SHAHZAD MIR, Dafadar, 11th B. L.  
 1898 .....WALKER, Capt. H. B., Duke of Cornwall's Light Infantry  
 1898 .....ADAM KHAN, Havildar, Guides Infantry  
 1899 .....DOUGLAS, Capt. J. A., 2nd Bengal Lancers  
 1899 .....MINA DIN, Nalk, Bengal S. and M.

# The Journal

OF THE

## United Service Institution of India.

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### REPORT ON SINGLE STAFF RIDE.

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UNDER THE DIRECTION OF BRIGADIER-GENERAL R. C. HART, V.C.,  
C.B., COMMANDING BELGAUM DISTRICT.

*March 1899.*

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### INTRODUCTION.

Not one of us had had the advantage of any previous experience of Staff Rides; I therefore arranged for a not too ambitious exercise. Thirty officers were employed.

Reports on manœuvres are often very dry reading for those who have not themselves taken an active part in them—Von Moltke's problems for example—and verbose orders are intolerable even to those who are present in the field. An effort has consequently been made to make this report easy, and not uninteresting, reading.

Text books usually condemn verbal orders, but many of the most important orders given in action, or on the line of march, are necessarily verbal orders. But, certainly, when an important order is given, and from which no departure is to be allowed—a combined operation for example—the order should be in writing, and, further, it would be necessary to require a receipt that the order was delivered.

There can be no object in filling up orders with the usual instructions given to Medical, Commissariat, Provost, and Signalling Officers, which can be given so much better personally to the Heads of the Departments, who have free access to the General and to his Staff Officers. However, certain orders of importance to these officers should undoubtedly be in writing. If an officer can settle his business equally well with a Staff Officer, he should not take up the time of the General.

It appears better to have no written orders at all than very long ones. The orders for the Austro-Russian Army were so long that, before they could be copied, the battle of Austerlitz had begun. Long

tent, fix standing and ridge poles in position, fold the fly over them and attach guy ropes. The tent will then be lifted a little to the left and the feet of the standing poles placed exactly over the spot on which they will eventually rest; the front pole close up against the centre peg.

All numbers will then stand in readiness to raise the tents on the bugle sounding; Nos. 7 and 8 lifting the ridge pole up and resting it on their knees; the remainder holding on to the guy ropes.

A native officer in each company will see that all his tents are ready and then report to the officer superintending the pitching of the camp, who will order the "Advance" to be sounded as soon as all companies have been reported ready.

Tents will be raised *from the right* on the last sound of the bugle and the four corners secured; the doors folded back at once to enable the non-commissioned officer to dress his standing poles in line with those of the tent next in rear; Nos. 7 and 8 inside the tent to move the poles as may be required, and *hold them in position while the guy and side ropes are being made fast.*

The men should be trained to work perfectly silently and should never be allowed to stand in the line of pegs and so obstruct the view of those superintending the dressing. Much shouting and confusion will be saved if these two points are attended to.

Pin bags and saleetahs should be kept off the ground on four pegs driven into the ground in the form of a square, one pace in front of the front standing pole.

Two ropes twisted together and stretched between standing poles, a few feet from the ground, will form a good substitute for an arm-rack.

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In practice, bicycle corps have carried very little luggage; their knapsacks were carried with the regimental baggage, and special arrangements were made as regards the luggage actually carried by the men.

The over-coat, coat, and breeches should be folded flat and carried in a broad water-proof bag.

This is attached to the bicycle frame by means of straps. When the bicycle has to be carried, this bag is first strapped on the back and

then forms a kind of numdah on which the bicycle rests. Everything else, including the ammunition, which the foot soldier carries in the pouch at the back, should be carried in two pouches or bags hanging from the sides. The cooking utensils and the iron ration would generally be left with the regimental baggage. The rifle should of course be attached to the bicycle, muzzle to the front, and the tool bag to the saddle.

It has now been sufficiently well shown that the chief fault of the folding bicycle is not as has been stated that no luggage can be carried in addition to it.

The statement that it would take a long time to strap the luggage and bicycle on the back does not hold good. As a rule, a well-trained detachment can do so in one minute.

The folding bicycle is just as good in every way as an ordinary bicycle. In case a man has to use his rifle in a hurry, he would leave his folding bicycle on the side of the road like any other bicycle until he wanted it again.

The author of the essay in N. 51 states that, when the folding bicycle is carried on the back, the rifle can only be carried in the hand. This does not hold good in regard to the proposed and tested folding bicycle, for the rifle can be carried over the left shoulder and can be slung over the right shoulder.

The "Styria" folding bicycle, model 1897, is a good machine in every respect, but the 26-inch wheels are not necessary; they, however, hardly make any difference in speed. The author, without any special training, rode 90 to 100 km. in 5 hours through very intersected country in Lorraine, and did the same performance in the same time on 28-inch wheels.

Count Pfeil states in his remarks that he has never seen a folding bicycle; his anxiety about it is therefore purely theoretical. He is, however, right in saying that a folding bicycle cannot be as safe and as durable as an ordinary bicycle.

We shall now give a description of the "Styria" military folding bicycle, model 1897.

The folding mechanism is the same as in all other known folding bicycles, such as the cycle pliante of Captain Gérard and the one made by Messrs. Seidel and Naumann. In the "Styria" the front and back wheels are made fast by means of bolts. The bolts are in the middle of both connecting rods and permit of their being pulled out of the hollow part of these rods, and both wheels can be laid on top of each other, covering each other completely. The wheels are then strapped on the back; the wheels projecting a little on the right side; the pedals and cog-wheel projecting on the left side. The saddle and handle bar are about the height of the man's head. Half of the upper connecting rod of the frame is so far over the left shoulder that the rifle can still be carried on it. The wheels, especially if a bag containing clothes is carried on the back, stand out far enough from the right side that the rifle can conveniently be carried over the right shoulder.

A practised rider can fold up his bicycle and strap it on his back in about half a minute; this includes the removal of the rifle from the bicycle. The weight of this bicycle is  $12\frac{1}{2}$  kg. ( $27\frac{1}{2}$  lbs.) and is lighter than the knapsack when packed for field service.

Some important peculiarities are: one-half of the handle bar can be made to fold up; a second seat can be attached in rear of the saddle to carry another person; the two folding parts of the bicycle can be entirely separated, so that two riders can carry a complete bicycle between them.

The last two arrangements are especially important; for wounded riders and their bicycles can thus be carried away. Above all, damaged bicycles can be at once replaced.

Reports on the experiments carried out on this bicycle in the Austrian Army speak very highly of it. A detachment of 24 riders used the older "Styria," model 1896, in the imperial manœuvres in 1896 near Csakathurn, and demonstrated its superiority over all other military bicycles. This detachment rode 2,800 km. (about 1,866 miles) in 6 weeks, sometimes over difficult ground, forests, etc. Lieutenant Czeipek was in command of this detachment and says: "This bicycle was made by Messrs. Puch & Co. in Graze; it is so solid and firm that one can ride through fields, along paths, and stony ground without any damage to it."

The strengthened pneumatic tyres that are used with this bicycle are very durable. Several firms, including German, such as that of Dürkop, have introduced perfectly puncture-proof pneumatic tyres, more than a year ago. They are proof against nails, pieces of glass, etc. Their price is of course very high.

In one respect the "Gérard" bicycle is superior to the "Styria," *viz.*, in the transmission of power; the former has no chain, but cog-wheels connected by a rod. Count Pfeil points out the unsuitability of the chain, and every experienced rider has found out its disadvantages at times. The cog-wheels show distinct progress. The author rode an "Acatene" (Greek: without chain) bicycle of the firm Metropole in Paris this summer for weeks. He rode from Metz to the Palatinate and the Rhine, and rode up hills 1,300 feet high and even higher without getting off and coasted down these hills at the rate of one kilometre (1,066 yards) in  $1\frac{1}{2}$  to 2 minutes without any damage to the mechanism. This bicycle was  $4\frac{1}{2}$  years old and had been constantly in use and tried a great deal by beginners who cause the most damage to bicycles.

The parts are made of hardened steel and with the accuracy of a watch.

The wearing out at the cog-wheels is insignificantly small.

Experience has shewn that in the course of a whole year the driving gear had to be attended to once; the ball bearings twice; cleaning out the covers of the cog-wheels 4 times. The author rode the above Acatene bicycle in heavy rain over a distance of 85 km. (55 miles) over

muddy and wet roads, the machine keeping its easy smooth action the whole time. The author has never heard of a case in which the teeth of the cog-wheels have been known to break.

As all the parts of the driving gear are made mathematically accurate, they are interchangeable, and spare parts can always be carried on the machine. This new method of transmission of power allows of high gearing, which is a very important factor where speed is concerned.

If the cog-wheel system could be applied to the "Styria" folding bicycle, it would undoubtedly become the most suitable bicycle for military purposes, as in the Acatene cog-wheel system there is less friction, less wear, and the driving gear remains much cleaner for a far longer time.

*From the "Militär Wochenblatt."*

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- 1872.....ROBERTS, Lieut.-Col. F. S., V.C., R.A.  
 1873.....COLQUHOUN, Capt. J. A. S., R.A.  
 1874.....COLQUHOUN, Capt. J. A. S., R.A.  
 1879.....ST. JOHN, Maj. O. B. C., R.E.  
 1880.....BARROW, Lieut. E. G., S.C.  
 1882.....MASON, Lieut. A. H., R.E.  
 1883.....COLLEN, Maj. E. H. H., S.C.  
 1884.....BARROW, Capt. E. G., S.C.  
 1887.....YATE, Lieut. A. C., S.C.  
 1888.....MAUDE, Capt. F. N., R.E.  
                 YOUNG, Maj. G. F., S.C. (specially awarded a silver medal).  
 1889.....DUFF, Capt. B., S.C.  
 1890.....MAGUIRE, Capt. C. M., S.C.  
 1891.....CARDEW, Lieut. F. G., S.C.  
 1893.....BULLOCK, Maj. G. M., Devon. Regt.  
 1894.....CARTER, Capt. F. C., Northumberland Fusiliers.  
 1895.....NEVILLE, Lieut.-Col. J. P. C., S.C.  
 1896.....BINGLEY, Capt. A. H., S.C.  
 1897.....NAPIER, Capt. G. S. F., 2nd Bn. Oxfordshire Light Infantry.  
 1898.....MULLALLY, Maj. H., R.E.  
                 CLAY, Capt. C. H., S.C. (specially awarded a silver medal).  
 1899.....NEVILLE, Col. J. P. C., S.C.

### MacGregor Memorial Silver Medallists.

- 1889.....BELL, Col. M. S., V.C., R.E. (specially awarded a gold medal).  
 1890.....YOUNGHUSBAND, Capt. F. E., K. Dn. Gds.  
 1891.....SAWYER, Maj. H. A., S.C.  
 1891.....RAMZAN KHAN, Havildar, 3rd Sikhs.  
 1892.....VAUGHAN, Capt. H. B., S.C.  
 1892.....JAGGAT SINGH, Havildar, 19th P. I.  
 1893.....BOWER, Capt. H., S.C. (specially awarded a gold medal).  
 1893.....FAZALDAD KHAN, Dafadar, 17th B. C.  
 1894.....O'SULLIVAN, Maj. G. H. W., R.E.  
 1894.....MULL SINGH, Sowar, 6th B. C.  
 1895.....DAVIES, Capt., Oxfordshire Light Infantry.  
 1895.....GUNGA DYAL SINGH, Havildar, 2nd B. I.  
 1896.....COCKERILL, Lieut. G. K., 28th P. I.  
 1896.....GHULAM NABI, Private, Q. O. Corps of Guides.  
 1897.....SWAYNE, Capt. E. J. E., 16th B. I.  
 1897.....SHAHZAD MIR, Dafadar, 11th B. L.  
 1898.....WALKER, Capt. H. B., Duke of Cornwall's Light Infantry.  
 1898.....ADAM KHAN, Havildar, Guides Infantry.  
 1899.....DOUGLAS, Capt. J. A., 2nd Bengal Lancers.  
 1899.....MIHR DIN, Naik, Bengal S. and M.

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### REPORT ON SINGLE STAFF RIDE.

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UNDER THE DIRECTION OF BRIGADIER-GENERAL R. C. HART, V.C.,  
C.B., COMMANDING BELGAUM DISTRICT.

*March 1899.*

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### INTRODUCTION.

Not one of us had had the advantage of any previous experience of Staff Rides; I therefore arranged for a not too ambitious exercise. Thirty officers were employed.

Reports on manœuvres are often very dry reading for those who have not themselves taken an active part in them—Von Moltke's problems for example—and verbose orders are intolerable even to those who are present in the field. An effort has consequently been made to make this report easy, and not uninteresting, reading.

Text books usually condemn verbal orders, but many of the most important orders given in action, or on the line of march, are necessarily verbal orders. But, certainly, when an important order is given, and from which no departure is to be allowed—a combined operation for example—the order should be in writing; and, further, it would be necessary to require a receipt that the order was delivered.

There can be no object in filling up orders with the usual instructions given to Medical, Commissariat, Provost, and Signalling Officers, which can be given so much better personally to the Heads of the Departments, who have free access to the General and to his Staff Officers. However, certain orders of importance to these officers should undoubtedly be in writing. If an officer can settle his business equally well with a Staff Officer, he should not take up the time of the General.

It appears better to have no written orders at all than very long ones. The orders for the Austro-Russian Army were so long that, before they could be copied, the battle of Austerlitz had begun. Long

orders, and premature orders, often necessitate counter-orders, which become a perfect terror to the victims concerned and shake all confidence.

If the true history of a battle is to be written, officers must keep note-books and enter anything of importance at the time. All Staff Officers and Commanding Officers should make these entries and not omit the exact hour.

The Divisional and Brigade Orders I have published; but only some of the Regimental and Departmental Orders, because of the necessary sameness. The Regimental Orders were generally good; the principal fault was that they sometimes included a good deal that did not concern the particular regiment. Certain verbal orders, personal orders, and orders written in the field in pocket books are also given in the Staff Diary, but some are omitted.

The Staff Ride was principally an exercise in staff duties and the issuing of orders in the field, and, in order to make it possible to deal with an instructive military situation, certain assumptions regarding the imaginary enemy were necessary. As often as desirable, officers were assembled for a conference.

R. C. H.

### DIVISIONAL STANDING ORDERS.

BY BRIGADIER-GENERAL R. C. HART, V.C., C.B., COMMANDING  
BELGAUM DIVISION.

1899.

- |                                  |   |
|----------------------------------|---|
| Parading.                        | 1. Troops must not be kept waiting on parade by being ordered to fall in unnecessarily early.   |
| Baggage.                         | 2. A baggage guard of three men and a non-commissioned officer per company will be detailed.  |
| 3. Commanding Officers           | will arrange that their men have some refreshment before early marches, and the same for men on night duty. The troops will always start with water-bottles full.   |
| Early marching, etc.             |   |
| 4. When the troops advance,      | the outposts will not be withdrawn until the advanced guard has passed through them and has secured the ground in their front. The outposts will then rejoin their corps on the line of march. In the event of a retirement, special orders will be issued. |
| Withdrawing picquets and guards. |   |
|                                  | Inlying picquets will join their companies at the time of parading for the march. The quarter guards will march immediately in rear of their respective regiments, and will have charge of all prisoners and 1st reserve ammunition.                        |

5. Parade states in pencil will be furnished to Brigadiers each morning showing British officers effective, and rank and file effective. When the Brigade marches very early, these states will be prepared and furnished on the march.

6. The Officer Commanding the leading corps will halt after the first half hour, and afterwards halt after each hour. Each halt will be for five minutes, unless prolonged by the Brigadier-General. The road must not be blocked.

7. On the march each corps or party will keep touch with the corps or party following, connecting files being dropped when necessary. Keeping the touch. In this way advanced guards will not march away from the troops they are covering, and rear guards will not be left behind. To act otherwise is to court disaster.

8. Except at halts, smoking should be discouraged on the line of march, because it is liable to produce short breath and palpitations of the heart. However, the men may smoke when marching at ease, if they wish to do so, but they should avoid strong tobacco.

9. Commanding Officers at the end of the march will at once report the number of men falling out, who have not rejoined their companies on the march. Men falling out will be reported on by the Medical Officer.

10. Officers Commanding companies are responsible that boots fit and that the men know how to take care of their feet and boots. Every precaution must be taken that the men do not catch chills after a march.

There will be an Arms, Boots and Feet Parade ordered by Company Commanders as soon as men have dined and washed, and cleaned their arms. One officer per company to attend.

11. No natives, except authorised followers, will be allowed within limits of camp. No followers will, under any circumstances, leave the limits of camp.

12. As soon as each corps arrives in camp, mounted officers will repair to Brigade head-quarters to receive brief instructions regarding the military situation, outposts, inlying picquets, water-supply, etc. Watches will be set by that of the Assistant Adjutant-General.

Each corps will send at once to Brigade head-quarters two orderlies, who will first ascertain the whereabouts of their battalion head-quarters. The orderlies of Officers Commanding corps will acquaint themselves with Brigade head-quarters.

When the officers' call is sounded, Commanding Officers with their Adjutants, the Senior Medical Officer, and the Field Officer of the day will wait on the Brigadier-General to receive orders. The

will communicate freely with head-quarters so as to avoid unnecessary writing.

At retreat corps will parade on their alarm posts, and afterwards occupy the exact positions required in case of attack. At the same time all followers will be assembled at the place indicated in case of attack. On the bugle sounding one "G" and "orders," corps will send to Brigade head-quarters to receive or copy orders.

13. No bugle calls except the "Dress" and "Fall in" will be sounded independently. The corps nearest Brigade head-quarters will sound the "Rouse" or "Reveill  ," "Retreat" and "Tattoo." All bugle calls from Brigade head-quarters will be repeated by all corps.

14. The Field Officer of the day will arrange to arrive early in camp. He will come on duty at "Rouse" or "Reveill  "; he will command the outposts and inlying picquets. He will be responsible for the regularity of the camp, being assisted by Quartermasters. He will report that picquets have ascertained the ranges of all prominent objects, and that the Officer Commanding has a diagram ready to hand over to the relieving officer.

15. Trenches for night latrines will be dug close to the troops and filled in at dawn. All trenches will be filled in, and great stress will be laid upon the cleanliness of the camp and upon the due observance of sanitation.

16. The Medical Officer for the day will inspect the camp and its surroundings in conjunction with the Provost Marshal. The Quartermasters will accompany these officers when visiting their respective camps. The Medical Officer for the day will report to the Senior Medical Officer, who will make a verbal report to the Brigadier-General. On the line of march he will be with the rear guard and have a suitable complement of dhoolies and riding animals.

17. Under no circumstances may a soldier or follower enter a village without orders. Commanding Officers will take the necessary steps to give effect to this order.

18. Commanding Officers will ascertain at once the proper road for moving out of camp. They will open up good internal communications.

19. Commanding Officers of corps and detachments will take great care in the preparation of reports concerning the part played by the troops under their command. These reports furnish the foundation of the despatches, in which full justice should be done to merit. The reports accompanied by rough sketches will be handed in not later than early on the morning following any march, or affair with the enemy.

20. In addition to Staff Diaries, all officers should keep diaries, and note down at the time any incident of importance, giving the exact hour.

21. Heads of Departments must early inform the Assistant Quarter-Master-General what information they require, so that he, in communication with the Officer Commanding the Cavalry, may avoid two reconnoitring patrols being sent in the same direction.

Any messenger conveying important information to head-quarters should communicate it to every General Officer that he may pass, if it is clearly desirable to do so. All ranks should be familiar with the standards of the Generals, but messengers are not to be delayed on any pretence.

22. The countersign will be issued confidentially to Brigadiers who will communicate it only to those who must know it. The new countersign will have effect from "Retreat."

### DIVISIONAL STAFF.

Divisional Commander	...	}	Brigadier-General R. C. Hart, V.C., C.B.
Assistant Adjutant-General	...		
Aides-de-Camp	...	}	2nd-Lieutenant B. Fraser, Attached 1st East Yorkshire Regiment.
			2nd-Lieutenant W. L. Twiss, 1st East Yorkshire Regiment.
Assistant Quarter-Master-General	...	}	Major C. J. Cockburn, 1st Royal Warwickshire Regiment.
			Captain A. J. Richardson, 1st East Yorkshire Regiment.
Deputy Assistant Quarter-Master-Generals for Intelligence.			Captain W. Sykes-Banks, Deputy Assistant Adjutant-General.
			Lieutenant C. J. Tawney, 1st East Yorkshire Regiment.
Colonel on the Staff Commanding Royal Artillery.		}	Major R. E. Boothby, R.A.
Lieutenant-Colonel Commanding Royal Engineers.			Lieutenant-Colonel P. G. Huggins, D.S.O.
Principal Medical Officer	...		Lieutenant R. W. Knox, M.B., I.M.S.
Divisional Commissariat Officer	...	}	Lieutenant-Colonel K. M. Foss, 26th Madras Infantry.
			Lieutenant H. A. Forte, 1st East Yorkshire Regiment.
Divisional Transport Officer	...		
Assistant Superintendent, Army Signalling.	Sig-	}	Lieutenant C. F. Cobb, 1st East Yorkshire Regiment.
Provost Marshal	...		

#### *Staff, 1st Brigade.*

Brigadier-General	...	...	} Lieutenant-Colonel E. M. Lawford, 1st Madras Lancers.
Deputy Assistant Adjutant and Quar- ter-Master-General.			
Orderly Officer	...	...	{ 2nd-Lieutenant W. T. Thompson, Attach- ed 1st East Yorkshire Regiment.
Brigade Commissariat Officer		...	
Brigade Transport Officer	...	...	} Lieutenant E. L. Edwards, 1st East York- shire Regiment.

*Staff, and Brigade.*

Brigadier-General	...	}	Colonel R. A. Gilchrist.
Deputy Assistant Adjutant and Quar- ter-Master-General.	...		
Orderly Officer	...	}	Lieutenant G. M. Forster, 1st Royal War- wickshire Regiment.
Brigade Commissariat Officer	...		
Brigade Transport Officer	...	}	Lieutenant C. E. Cobb, 1st East York- shire Regiment.
		}	2nd-Lieutenant J. F. Woodham, Attached 1st East Yorkshire Regiment.

**DETAIL OF TROOPS.***Divisional Troops.*

1st Madras Lancers	...	}	Major G. Kerrich, 1st Madras Lancers. 2nd-Lieutenant J. Bruce.
49th Field Battery, Royal Artillery	...		
72nd Field Battery, Royal Artillery	...	}	Lieutenant G. J. Henderson, R.A.
Nos. 1 and 2 Companies, Madras Sappers and Miners.	...		
Ammunition Column	...	}	Lieut.-Colonel P. G. Huggins, D.S.O.
21st Madras Pioneers	...		
A and B Sections, No. 1 British Field Hospital.	...	}	Major R. E. Boothby, R.A. Lieut.-Colonel P. G. Huggins, D.S.O.
No. 1 Native Field Hospital	...		
		}	Lieutenant R. W. Knox, M.B., I.M.S.

*1st Brigade.*

1st Battalion East Yorkshire Regi- ment.	...	}	Major T. N. Bagnall, 1st East Yorkshire Regiment.
2nd Battalion The Welsh Regiment	...		
20th Madras Infantry	...	}	Captain E. Firth, 9th Madras Infantry.
26th Madras Infantry	...		
No. 2 British Field Hospital	...	}	Lieutenant F. V. L. Pritchard, 26th Mad- ras Infantry.
No. 2 Native Field Hospital	...		
		}	Lieutenant R. W. Knox, M.B., I.M.S.

*2nd Brigade.*

1st Royal Warwickshire Regiment	...	}	Major H. E. Irwin, 1st Royal Warwick- shire Regiment.
2nd Derbyshire Regiment	...		
9th Madras Infantry	...	}	Captain H. Haggard, 1st East Yorkshire Regiment.
15th Madras Infantry	...		
No. 3 British Field Hospital	...	}	Major J. Jackson, 9th Madras Infantry.
No. 3 Native Field Hospital	...		
		}	Lieutenant R. W. Knox, M.B., I.M.S.

**GENERAL IDEA.**

The enemy has effected a landing in force at Goa, and relies upon a native rising. A British Division has been concentrated at Belgaum.





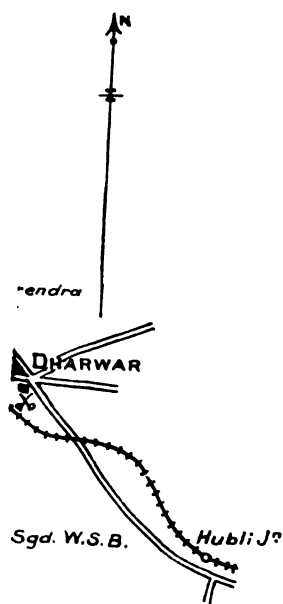
# F COUNTRY ATED OVER.

1 Inch = 8 Miles.



## SIGNS.

- ing Grounds ... •
- f Actions ... X



*Special Idea for British Division.*

Attack without delay the invaders who are concentrating at Dharwar.

---

*Information.*

(1) The invaders are regular troops of good quality, well supplied and equipped.

(2) The railway from Belgaum to Londa cannot be used, as all the bridges have been blown up by native partisans. There is no road to Londa, and the country in parts is densely wooded and hilly, whereas the direct road to Dharwar is excellent, and the country very suitable for the movement of all arms.

(3) Mobilisation tents will be carried.

(4) Gilchrist's Brigade is encamped about the Fort. Lawford's Brigade and the Divisional Troops are encamped on west and south of cantonments.

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**DIVISIONAL ORDERS.**

---

BY BRIGADIER-GENERAL R. C. HART, V.C., C.B., COMMANDING  
BELGAUM DIVISION.

BELGAUM;

10 A.M., 7th March 1899.

1. The invaders are reported to be concentrating at Dharwar. So far there has been no general rising, but small parties of natives have destroyed the railway bridges, and are likely to harass the march and fire into camps.

2. The Division will march on Dharwar to-morrow by the Grand Trunk Road, and camp at the most suitable position near Hooblee, about 16 miles from Belgaum Fort.

3. The 1st Madras Lancers will move at dawn, and working independently will cover the movement. One contact squadron to get in touch with the enemy. The road and country in advance to be reconnoitred as far as possible. The line of railway and right flank require special care. Whether the Cavalry withdraw to camp, or remain beyond, is left to the discretion of Major Kerrich, who will give his own orders regarding his baggage.

4. The 1st Brigade (Lawford's) will commence to march at 6-30 A.M., covered by its advanced-guard, and flankers where necessary. The 49th Field Battery, the two companies of Sappers and 21st Pioneers will be attached to the 1st Brigade for the march. The Divisional Staff baggage with the 1st Brigade baggage. The 1st Brigade will find the outposts.

5. The 2nd Brigade (Gilchrist's) will commence to move at 8-30 A.M. The 72nd Field Battery, the Divisional Reserve Ammunition, the Divisional Hospital, and Divisional Commissariat will be attached to the 2nd Brigade for the march. The 2nd Brigade will find a small rear guard, and guard its own flanks.

6. The men will carry one day's rations complete, except meat. Three days' meat will be driven in Brigade charge. Two days rations for men and horses in Brigade charge, except hay, of which one day's supply only will be carried. The horses to carry one day's grain. Divisional Commissariat Officer to report daily what supplies he has obtained locally on the march. Commandant, Fort Belgaum, will collect what he can and protect hay ricks. Divisional Commissariat Officer to report what he can carry with transport available, and amount of live-stock.

7. Brigadier-General Hart will march at 9-30 A.M. and catch up the advanced-guard.

By order,

REGD. C. HART,

*Assistant Adjutant-General.*

---

### STAFF DIARY.

BELGAUM;

*7th March 1899.*

Yesterday evening received orders to march against the invaders who are concentrating on Dharwar.

The General Officer Commanding decided to march by the Grand Trunk Road and not to operate by the railway and Londa, because the bridges are broken and the country that way is hilly, thickly wooded, unsuitable for the movement of troops, and there is not a good road the whole way, whereas the Dharwar road passes through excellent country for all arms, and there are abundant supplies. Further, if the enemy should move on Belgaum from Dharwar, there would be no cross-country roads by which to move to attack him, and the main object of the General Officer Commanding is to bring the invaders' field army to battle before sedition spreads.

450 sick or sickly men to remain at Belgaum, and there are four 12-pr. Armstrong guns and two machine guns in the Fort in charge of the sick men of the Artillery.

Villagers everywhere warned that if any hostile acts, the villages within 5 miles will be burnt, and head-men hanged.

Mobilisation tents are taken for practice in calculations. Although the dew is heavy, waterproof sheets would have met the case.

The weather is fine. Dawn at 6-15, dusk at 18-30. It will be new moon on the 11th.

REGD. C. HART,

*Assistant Adjutant-General.*

**REGIMENTAL ORDERS.**

BY MAJOR G. S. KERRICH, COMMANDING 1ST MADRAS LANCERS,  
FORT BELGAUM;

*12-30 P.M., 7th March 1899.*

1. Divisional Orders will be read over to the men daily with Regimental Orders.
2. In accordance with the Divisional Orders of to-day, the 1st Madras Lancers will march at 6 A.M. to-morrow on Dharwar by the Grand Trunk Road, to reconnoitre the enemy and country in that direction and to screen the advance of the Division.
3. The B (Centre advanced) Squadron will march by the Grand Trunk Road. The A (Right advanced) and B (Left advanced) Squadrons will march in a general line, about 3 miles north-east and south-west, respectively, of the Grand Trunk Road, and parallel to it. The C Squadron will follow on the Grand Trunk Road, about 3 miles in rear as support.
4. The supporting Squadron will send out an officer's patrol of the strength of a field troop to watch the Belgaum-Londa railway, and a section patrol along the Grand Trunk Road.
5. The D Squadron under Lieutenant Popham will march independently as a contact Squadron to keep touch with the enemy.
6. Advanced Squadrons will march at the rate of 5 miles an hour, excluding halts.
7. Halts for communication are to be made every hour for a quarter of an hour as follows: 1st halt, from 7 to 7-15 A.M., 5 miles from Belgaum; 2nd halt, from 8-15 to 8-30 A.M., 10 miles from Belgaum, and so on.
8. On arrival at Kittur, march outposts will be thrown out.
9. One day's rations will be carried in each man's havresack, and one day's grain in the nose-bag on each horse.
10. Twenty rounds of ammunition a man will be carried.
11. Reports are to be sent at every halt of the attitude of the Badly villagers, who are to be warned that their villages will be fired in the event of their harassing the march, and whether or no the country expressed. R. C. H. examined is clear of the enemy.
12. The baggage will march with the baggage of the 1st Brigade. No authority in Divisional Orders.
13. Standing and routine orders will be enforced as far as possible. Standing Orders must be obeyed. No. 13 unnecessary. R. C. H.
14. The Officer Commanding 1st Madras Lancers will be with the supporting Squadron.

By order,  
J. BRUCE, *Lieutenant*,  
*Adjutant, 1st Madras Lancers.*

**BRIGADE ORDERS.**

BY LIEUTENANT-COLONEL E. LAWFORD, COMMANDING 1ST  
BRIGADE, BELGAUM DIVISION.

BELGAUM;

11 A.M., 7th March 1899.

Marginal  
references  
unnecessary.  
They have  
been removed  
from other  
orders.

R. C. H.

No. 1,—

1. (i) The enemy, good regular troops, has effected a landing in force at Goa. Is concentrating at Dharwar. No general rising of natives has occurred so far. The railway has been destroyed between Londa and Dharwar.

(ii) Our Cavalry, strength one regiment, working independently, is covering our front.

Not so stated. Intention of General Officer  
See D. O. 2. Commanding Division.  
R. C. H.

2. To attack without delay the troops which are concentrating at Dharwar.

3. The following Divisional Troops have been placed at the disposal of the General Officer Commanding 1st Brigade for the march:—

Divisional Troops.  
49th Field Battery, Royal Artillery.  
Nos. 1 and 2 Companies, Sappers and Miners.  
21st Pioneers.

4. The 1st Brigade, and the above-mentioned Divisional Troops, will march from camp at 6-30 A.M. tomorrow by the Grand Trunk Road on

Dharwar.

Advanced Guard.

(Not in order of march.)

5. The Advanced Guard under Lieutenant-Colonel A. will move off at 6-30 A.M.—

1st Battalion East Yorkshire Regiment.

Nos. 1 and 2 Companies, Sappers and Miners.

Interval of 1 mile to head of main-body of Brigade.

6. The main-body will follow in the order, and at the times given below:—

Main-body, 1st Infantry Brigade.

6-55 A.M.

...

... 21st Pioneers.

7-2 "

...

... 49th Field Battery, Royal Artillery.

7-6 "

...

... 2nd Battalion Welsh Regiment.

7-13 "

...

... 20th Madras Infantry.

7-20 "

...

... 26th Madras Infantry.

No reference  
to flank  
guards.  
The head or  
rear of corps  
to pass a  
certain point  
at times  
given.  
The battery  
is so wedged  
in among  
infantry that  
it must march  
at an  
unnatural  
pace.

R. C. H.

**Ammunition Column and Field Hospitals.**

**7. Brigade Reserve Ammunition moves off at 7-27 A.M.—**

No. 2 Field Hospital ... British Troops, 7-35 A.M.

No. 2 " " ... Native Troops, 7-40 A.M.

Where is the Commissariat?

R. C. H.

**Baggage.**

**8. The baggage will follow the main-body at 7-50 A.M.**

Certain light baggage should be with corps.

**Tents and baggage in same order as march of troops.**

R. C. H.

**Baggage.**

**9. The Officer Commanding 26th Madras Infantry will detail two companies as baggage guard.**

**Position of General Officer Commanding 1st Brigade.**

**10. The General Officer Commanding 1st Brigade will march at the head of the main-body.**

Should come last in orders.

**Outposts.**

**11. On arrival at Hooblee the Advanced Guard under Lieutenant-Colonel A. will form the outposts.**

**Arrangements in camp.**

**12. The Brigade Quarter-Master will make all arrangements for watering men and animals, for latrines and kitchens.**

Unnecessary. D.A.Q.M.G. should give instructions to each corps. Brigade Quarter-Master may be dispensed with.

**Rations.**

**13. Rations will be issued daily at 4 P.M.**

May not always be possible.

**Alarm Post.**

**14. The Alarm Posts will be the Quarter Guard of each regiment and unit, facing east.**

Better decide after seeing the camp.

**Orders.**

**15. Brigade-Majors will attend at Brigade head-quarters daily at 5 P.M. Brigade Orders will be issued at 5-15 P.M.**

See Divisional Standing Order No. 12.

R. C. H.

By order,

E. LAWFORD, *Lieut.-Col.*,

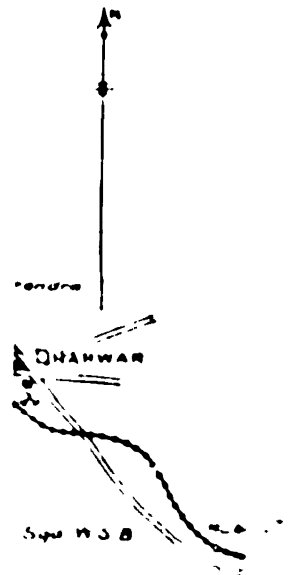
*Deputy Assistant Adjutant-General.*

# OF COUNTRY ATED OVER

1 Inch = 8 Miles

## SIGNS.

ng Grounds	•
f Actions	X



*Special Idea for British Division.*

Attack without delay the invaders who are concentrating at Dharwar.

---

*Information.*

(1) The invaders are regular troops of good quality, well supplied and equipped.

(2) The railway from Belgaum to Londa cannot be used, as all the bridges have been blown up by native partisans. There is no road to Londa, and the country in parts is densely wooded and hilly, whereas the direct road to Dharwar is excellent, and the country very suitable for the movement of all arms.

(3) Mobilisation tents will be carried.

(4) Gilchrist's Brigade is encamped about the Fort. Lawford's Brigade and the Divisional Troops are encamped on west and south of cantonments.

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**DIVISIONAL ORDERS.**

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BY BRIGADIER-GENERAL R. C. HART, V.C., C.B., COMMANDING  
BELGAUM DIVISION.

BELGAUM;

10 A.M., 7th March 1899.

1. The invaders are reported to be concentrating at Dharwar. So far there has been no general rising, but small parties of natives have destroyed the railway bridges, and are likely to harass the march and fire into camps.

2. The Division will march on Dharwar to-morrow by the Grand Trunk Road, and camp at the most suitable position near Hooblee, about 16 miles from Belgaum Fort.

3. The 1st Madras Lancers will move at dawn, and working independently will cover the movement. One contact squadron to get in touch with the enemy. The road and country in advance to be reconnoitred as far as possible. The line of railway and right flank require special care. Whether the Cavalry withdraw to camp, or remain beyond, is left to the discretion of Major Kerrich, who will give his own orders regarding his baggage.

4. The 1st Brigade (Lawford's) will commence to march at 6-30 A.M., covered by its advanced-guard, and flankers where necessary. The 49th Field Battery, the two companies of Sappers and 21st Pioneers will be attached to the 1st Brigade for the march. The Divisional Staff baggage with the 1st Brigade baggage. The 1st Brigade will find the outposts.

5. The 2nd Brigade (Gilchrist's) will commence to move at 8-30 A.M. The 72nd Field Battery, the Divisional Reserve Ammunition, the Divisional Hospital, and Divisional Commissariat will be attached to the 2nd Brigade for the march. The 2nd Brigade will find a small rear guard, and guard its own flanks.



## REGIMENTAL ORDERS.

---

BY LIEUTENANT F. V. L. PRITCHARD, COMMANDING 26TH  
MADRAS INFANTRY.

NATIVE INFANTRY LINES,  
BELGAUM;

*3 P.M., 7th March 1899.*

Nos. 1 and 2  
might have  
been omitted.

1. The enemy, good regular troops, has effected a landing at Goa, and is concentrating at Dharwar. No general rising of natives has occurred so far. The railway has been destroyed.

2. To attack without delay the troops concentrating at Dharwar.

To-morrow?

3. The regiment will fall in at 7-5 A.M. and move off at 7-20 A.M., and march by the Grand Trunk Road to Hooblee in rear of the 20th Madras Infantry.

Vide B. O.  
No. 7.

4. The two Small Arms Ammunition carts and two mules will march in rear of the regiment. The remainder of the ammunition to move off with the Brigade Reserve Ammunition at 7 A.M. with an escort, No. 4 Section, "F" Company.

5. The heavy baggage will be ready to move off at 8-30 A.M. in rear of that of the 20th Madras Infantry.

Vide B. O.  
No. 8.  
Clashes with  
D. O. No. 5.

"G" and "H" Companies under Lieutenant Q. will act as baggage guard to the baggage of the Brigade, which commences to move off at 7-50 A.M.

Vide D. O.  
No. 6.

6. One day's rations to be carried.

R. C. H.

F. PRITCHARD, *Lieut.*,

*Commanding 26th Madras Infantry.*

## REGIMENTAL ORDERS.

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BY LIEUTENANT-COLONEL P. G. HUGGINS, D.S.O., COMMANDING  
21ST MADRAS PIONEERS.

BELGAUM;

*1 P.M., 7th March 1899.*

Nos. 1 and 2  
not absolutely  
necessary.

1. The enemy, good regular troops, has effected a landing at Goa, and is concentrating at Dharwar. No general rising of natives has occurred so far. Railway has been destroyed.

2. To attack without delay the troops that are concentrating at Dharwar.

3. The regiment is attached, for to-morrow's march, to the 1st Brigade.

4. The regiment will fall in at 6-40 A.M., move off at 6-55 A.M., marching by the Grand Trunk Road to Hooblee. To march at the head of the main-body, at 1 mile distance from the advanced guard.

5. Three mules will accompany each company. The remainder of the 1st and 2nd Reserve Ammunition, with a guard consisting of No. 4 Section of "H" Company, will move with the Brigade Reserve Ammunition Column at 7-25 A.M.

Mules assumed, and mountain warfare organisation. For the Plains follow Infantry Drill, S. 132 (4).

6. The Regimental Transport Officer will arrange that the heavy baggage is ready to move off at 8 A.M. It will follow that of the two companies, Sappers and Miners. The 26th Madras Infantry furnish the guard over the Divisional and Brigade baggage, but one non-commissioned officer and eight privates (one per company) will accompany the regimental baggage.

Not in agreement with B. O. No. 8. The Brigadier should have stated exactly where the baggage was to start from. D.S.O. No. 2 overlooked.

7. Men to carry one day's dry rations and animals one day's grain.

8. The Divisional, Brigade and Regimental Standing Orders for these operations are to be adhered to at all times by all ranks.

Not a necessary order.  
R. C. H.

P. G. HUGGINS, *Lieut.-Col.*,  
*Commandant, 21st Pioneers.*

## 2ND BRIGADE ORDERS.

BY COLONEL R. A. GILCHRIST, COMMANDING 2ND BRIGADE.

BRIGADE HEAD QUARTERS,  
BELGAUM;

11 A.M., 7th March 1899.

1. Enemy reported to be concentrating at Dharwar. So far no general rising. Natives have destroyed railway bridges, and likely to harass the march and fire into camp.

2. The Officer Commanding Division has decided to march on Dharwar to-morrow by the Grand Trunk Road and camp near Hooblee, about 16 (sixteen) miles from Belgaum Fort.

3. 72nd Field Battery, Royal Artillery,  
Divisional Reserve Ammunition,  
Divisional Field Hospitals,  
Divisional Commissariat.

are attached to the Brigade for the march.

There is too  
much in No.  
4 for easy  
reference.

4. The Brigade will march at 8-30 A.M. to-morrow, following 1st Brigade.

The connecting party being furnished by the 1st Royal Warwickshire Regiment.

### *Order of March.*

72nd Field Battery, Royal Artillery	...	...	8-30 A.M.
1st Royal Warwickshire Regiment	...	...	8-37 "
2nd Derbyshire Regiment	...	...	8-44 "
9th Regiment, Madras Infantry	...	...	8-51 "
15th Regiment, Madras Infantry	...	...	8-58 "

### Light baggage consisting of—

1st Reserve Ammunition,

Water mules,

Signalling equipment,

Entrenching tools,

Field stretchers and regimental ambulance transport,

will follow their respective units.

Divisional and Brigade Reserve Ammunition, marching at 9-5 A.M., will follow immediately after the light baggage of the rear unit.

Divisional and Brigade Field Hospitals, marching at 9-15 A.M., will follow the ammunition column.

Quite right  
to fix a spot.

In the above order, and at the time stated, each unit will join the line of march at the railway crossing south-west of the Fort.

5. Each battalion will furnish its own flank guards. The 15th Regiment, Madras Infantry, will furnish one company as a rear guard; also the flank guards for the trains.

Vide D.S.O.  
No. 2  
overlooked.

6. A baggage guard of one man per company from each battalion under a non-commissioned officer will be detailed.

Hour quite  
correct  
because  
rendezvous  
is some  
distance from  
railway cross-  
ing mentioned  
in No. 4.  
Unnecessary  
order.

### 7. Heavy baggage consisting of—

Cooking utensils, tents, kits, supplies, spare animals, and all baggage not stated in Order No. 4.

will be handed over to the Divisional Transport Officer by 8 A.M. on the Kulladghee Road, north-east of the Fort.

Might be  
communicat-  
ed verbally.

8. Alarm Posts and halts will be as laid down in Standing Orders throughout the march.

9. Men will carry one day's rations complete, except meat, which will be issued as soon as practicable after arrival in camp.

10. Brigade Orders will be issued daily as soon as possible after arrival in camp. Officers Commanding Units will be informed when to attend on the Officer Commanding Brigade for orders.

R. C. H.

11. The Officer Commanding Brigade will march at the head of the brigade.

By order,

R. GILCHRIST, Colonel,

*Deputy Assistant-Adjutant-General, and Brigadier.*

## REGIMENTAL ORDERS.

BY MAJOR H. E. IRWIN, COMMANDING 1ST ROYAL WARWICKSHIRE  
REGIMENT.

THE CLUB, BELGAUM ;

4 P.M., 7th March 1899.

1. Enemy reported to be concentrated at Dharwar. So far no general rising. Natives have destroyed railway bridges, and likely to harass march and fire into camps. Not absolutely necessary.

2. The Division will march to Dharwar to-morrow by the Grand Trunk Road and camp near Hooblee, about 16 miles from Belgaum Fort.

3. The Brigade will march at 8-30 A.M. to-morrow, following the 1st Brigade in the following order :— Quite right to omit other corps.

72nd Field Battery, Royal Artillery.

1st Royal Warwickshire Regiment.

4. The battalion will parade at 8-15 A.M. to-morrow and will join the line of march at railway crossing south-west of Fort at 8-37 A.M.

"A" Company will form an advanced guard connecting 1st and 2nd Brigades.

"B" and "C" Companies will form right and left flank guards for the battalion.

5. The first reserve ammunition—

Water mules,  
Signalling equipment,  
Entrenching tools,  
Field stretchers and regimental ambulance,

Bullocks ?

will follow in rear of the battalion.

The remainder of the baggage will be loaded up at the Regimental Quarter Guard by 7-45 A.M. under the Regimental Transport Officer, who will report himself with baggage at 8 A.M. to the Divisional Transport Officer on the Kulladghee Road, north-east of Fort.

A baggage guard of one non-commissioned officer and one man per company will accompany the baggage. vide remark to B. O. No. 6.

6. One day's rations, except meat, will be issued on parade, and carried in havresacks. The meat will be issued on arrival in camp.

7. When in camp the Regimental Quarter Guard will always be the Alarm Post for the battalion.

By order,

H. E. IRWIN, Major, -

for Adjutant, 1st Royal Warwickshire Regiment.

*Remarks.*

- (i) Names of places should be printed in capitals.  
 (ii) Marginal note to each order makes reference easier.

I think it  
 causes  
 unnecessary  
 writing in the  
 field.

R. C. H.

R. GILCHRIST, *Colonel*

**BRIGADE DIVISION ORDERS.**

BY **LIEUTENANT-COLONEL B., COMMANDING BRIGADE DIVISION**  
**ROYAL ARTILLERY.**

**1ST BRIGADE CAVALY,**

**BELGAUM;**

*12 noon, 7th March 1911.*

1. The Division will march on Dharwar to-morrow by the Co. Trunk Road and camp near Hooblee, about 16 miles from Belgaur Fort.

2. The 49th Field Battery, Royal Artillery, will march with the 1st Brigade, the 72nd Field Battery, Royal Artillery, with the 2nd Brigade.

3. Men will carry one day's rations complete, except meat. Three days' meat and two days' rations for men will be Brigade charge. Two days' grain for horses will be carried by the batteries. Officers Commanding Batteries will submit early rations for transport, rations, and forage, and will arrange to carry day's rations (except meat) and one day's grain from the Commissariat this afternoon.

4. All horses to be fed and watered, if possible, before starting. One feed per horse to be carried in nose-bags, and the remainder of the grain in the gram bags.

5. Officers Commanding Batteries will arrange for tea for their men before starting.

6. The 49th Field Battery will march with the main body of the 1st Brigade and will be ready to move off at 6.55 A.M., and will follow the 2nd Madras Pioneers.

7. The baggage of 1st Brigade will follow the main body of the 1st Brigade at 7.15 A.M. in the same order of march as the troops. The Officer commanding 49th Field Battery, Royal Artillery, will detail a commissioned officer to take charge of the Battery baggage, who will report himself to the Brigade Transport Officer for orders at 7.45 A.M.

Not necessary. A  
 Divisional  
 Staffing  
 Officer.  
 The Brigade or  
 Divisional  
 Staffing Officer.

R. C. H. S. O.  
 No. 2.

*Note.*—The 26th Madras Infantry furnish a baggage guard.

8. The 72nd Field Battery will march with the main-body of the 2nd Brigade and will be ready to move off at 8-25 A.M. and will lead the 2nd Brigade. The Brigadier gave a starting point which should be stated, Too verbose.

9. The light baggage, *vis.*, water mules and ambulance transport, will march immediately in rear of the Battery. The remainder of the baggage will be handed over to the Divisional Transport Officer by 8 A.M. on the Kulladghee Road, north-east of the Fort. The Officer Commanding 72nd Field Battery will detail one non-commissioned officer to take charge of the Battery baggage, who will report himself to the Divisional Transport Officer at 7-50 A.M. for orders. Vide D. S. O. No. 2.

10. Native followers will march with the baggage, and when in camp will, on no account, be allowed to leave its limits. No natives, except followers, will be allowed in camp. Unnecessary. D. S. O. No. 11.

11. Officers Commanding Batteries will furnish parade states in pencil as early as possible each morning. Unnecessary. D. S. O. No. 5.

12. At retreat batteries will parade at their alarm posts, and all followers will be sent to the place indicated in case of attack. The alarm post for each battery will be its own gun park. R. C. H. First part unnecessary. D. S. O. No. 12.

13. All villages are out of bounds. Unnecessary. D. S. O. No. 17.

14. The Officer Commanding Brigade Division, Royal Artillery, will march with the 49th Field Battery, Royal Artillery. R. C. H.

By order,

G. HENDERSON, *Lieut., R.A.,*  
*Acting Adjutant, Royal Artillery.*

#### Remarks.

Names of places should be printed in capitals.

R. GILCHRIST, *Colonel.*

### BATTERY ORDERS.

BY LIEUTENANT G. HENDERSON, COMMANDING 72ND FIELD BATTERY, ROYAL ARTILLERY.

2ND BRIGADE CAMP,

BELGAUM;

12-30 P.M., 7th March 1892. Not possible to publish so soon after B. D. orders What main body?

1. The Battery will march to-morrow with the main-body.

## BRIGADE ORDERS.

BY LIEUTENANT-COLONEL E. LAWFORD, COMMANDING 1ST  
BRIGADE, BELGAUM DIVISION.

BELGAUM;

11 A.M., 7th March 1857.

Marginal  
references  
unnecessary.  
They have  
been removed  
from other  
Orders.

R. C. H.

No. 1.—

1. (i) The enemy, good regular troops, has effected a landing force at Goa. Is concentrating at Dharwar. No general rising of natives has occurred so far. The railway has been destroyed between Londa and Dharwar.

(ii) Our Cavalry, strength one regiment, working independently, is covering our front.

Not so stated.  
See D. O. 2.

Intention of General Officer  
Commanding Division.

R. C. H.

2. To attack without delay the troops which are concentrating at Dharwar at the disposal of the General Officer Commanding 1st Brigade for the march —

Divisional Troops.

49th Field Battery, Royal Artillery.

No. 1 and 2 Companies, Sappers and Miners.

21st Pioneers.

4. The 1st Brigade, and the above-mentioned Divisional Troops will march from camp at 6-30 A.M. tomorrow by the Grand Trunk Road to

Order of march.

Dharwar.

4 and 5  
should be  
combined.

R. C. H.

Advanced Guard.

(Not in order of march.)

5. The Advanced Guard under Lieutenant-Colonel A. will move off at 5-30 A.M. —

1st Battalion East Yorkshire Regiment.

No. 1 and 2 Companies, Sappers and Miners.

Interval of 1 mile to head of main body of Brigade.

6. The main-body will follow in the order, and at the times given below —

No reference  
to flank  
guards.  
The head or  
rear of corps  
to pass a  
certain point  
at times  
given.  
4th Battery  
is so wedged  
in among  
infantry that  
it must march  
at an  
unequal  
pace.

Main-body 1st Infantry Brigade.

6-55 A.M.

...

... 21st Pioneers.

7-2 "

...

... 49th Field Battery, Royal Artillery.

7-6 "

...

... 2nd Battalion West Regiment.

7-13 "

...

... 24th Madras Infantry.

7-20 "

...

... 26th Madras Infantry.

R. C. H.

Ammunition Column and Field Hospitals.

7. Brigade Reserve Ammunition moves off at 7-27 A.M.—

No. 2 Field Hospital .. ... British Troops, 7-35 A.M.

No. 2 „ „ ... Native Troops, 7-40 A.M.

Where is the Commissariat?

R. C. H.

Baggage.

8. The baggage will follow the main-body at 7-50 A.M.

Certain light baggage should be with corps.

R. C. H.

Tents and baggage in same order as march of troops.

Baggage.

9. The Officer Commanding 26th Madras Infantry will detail two companies as baggage guard.

Position of General Officer Commanding 1st Brigade.

10. The General Officer Commanding 1st Brigade will march at the head of the main-body.

Should come last in orders.

Outposts.

11. On arrival at Hooblee the Advanced Guard under Lieutenant-Colonel A. will form the outposts.

Arrangements in camp.

12. The Brigade Quarter-Master will make all arrangements for watering men and animals, for latrines and kitchens.

Unnecessary. D.A.Q.M.G. should give instructions to each corps. Brigade Quarter-Master may be dispensed with.

Rations.

13. Rations will be issued daily at 4 P.M.

May not always be possible.

Alarm Post.

14. The Alarm Posts will be the Quarter Guard of each regiment and unit, facing east.

Better decide after seeing the camp.

Orders.

15. Brigade-Majors will attend at Brigade head-quarters daily at 5 P.M. Brigade Orders will be issued at 5-15 P.M.

See Divisional Standing Order No. 12.

R. C. H.

By order,

E. LAWFORD, *Lieut.-Col.*,

*Deputy Assistant Adjutant-General.*



## REGIMENTAL ORDERS.

BY LIEUTENANT F. V. L. PRITCHARD, COMMANDING 26TH  
MADRAS INFANTRY.

NATIVE INFANTRY LINES

BELGAUM;

3 P.M., 7th March 1897.

Nos. 1 and 2  
might have  
been omitted.

1. The enemy, good regular troops, has effected a landing at Goa, and is concentrating at Dharwar. No general rising of the people has occurred so far. The railway has been destroyed.

2. To attack without delay the troops concentrating at Dharwar.

To-morrow?

3. The regiment will fall in at 7-5 A.M. and move off at 8 A.M., and march by the Grand Trunk Road to Hooblee in rear of the 20th Madras Infantry.

Vide B. O.  
No. 7.

4. The two Small Arms Ammunition carts and two mules will march in rear of the regiment. The remainder of the ammunition will move off with the Brigade Reserve Ammunition at 7 A.M. with an escort, No. 4 Section, "F" Company.

5. The heavy baggage will be ready to move off at 8-30 A.M. in rear of that of the 20th Madras Infantry.

Vide B. O.  
No. 8.  
Clashes with  
D. O. No. 3.

"G" and "H" Companies under Lieutenant Q. will act as baggage guard to the baggage of the Brigade, which commences to move off at 7-50 A.M.

Vide D. O.  
No. 6.

6. One day's rations to be carried.

R. C. H.

F. PRITCHARD, Lieut.

Commanding 26th Madras Infantry.

## REGIMENTAL ORDERS.

BY LIEUTENANT-COLONEL P. G. HUGGINS, D.S.O., COMMANDING  
21ST MADRAS PIONEERS.

BELGAUM

1 P.M., 7th March 1897.

Nos. 1 and 2  
not absolutely  
necessary.

1. The enemy, good regular troops, has effected a landing at Goa, and is concentrating at Dharwar. No general rising of the people has occurred so far. Railway has been destroyed.

R. C. H.

2. To attack without delay the troops that are concentrating at Dharwar.

3. The regiment is attached, for to-morrow's march, to the 1st Brigade.

4. The regiment will fall in at 6-40 A.M., move off at 6-55 A.M., marching by the Grand Trunk Road to Hooblee. To march at the head of the main-body, at 1 mile distance from the advanced guard.

5. Three mules will accompany each company. The remainder of the 1st and 2nd Reserve Ammunition, with a guard consisting of No. 4 Section of "H" Company, will move with the Brigade Reserve Ammunition Column at 7-25 A.M.

Mules assumed, and mountain warfare organisation. For the Plains follow Infantry Drill, S. 132 (4).

6. The Regimental Transport Officer will arrange that the heavy baggage is ready to move off at 8 A.M. It will follow that of the two companies, Sappers and Miners. The 26th Madras Infantry furnish the guard over the Divisional and Brigade baggage, but one non-commissioned officer and eight privates (one per company) will accompany the regimental baggage.

Not in agreement with B. O. No. 8. The Brigadier should have stated exactly where the baggage was to start from. D.S.O. No. 2 overlooked.

7. Men to carry one day's dry rations and animals one day's grain.

8. The Divisional, Brigade and Regimental Standing Orders for these operations are to be adhered to at all times by all ranks.

Not a necessary order. R. C. H.

P. G. HUGGINS, *Lieut.-Col.*,

*Commandant, 21st Pioneers.*

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## 2ND BRIGADE ORDERS.

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BY COLONEL R. A. GILCHRIST, COMMANDING 2ND BRIGADE.

BRIGADE HEAD QUARTERS,

BELGAUM ;

11 A.M., 7th March 1899.

1. Enemy reported to be concentrating at Dharwar. So far no general rising. Natives have destroyed railway bridges, and likely to harass the march and fire into camp.

2. The Officer Commanding Division has decided to march on Dharwar to-morrow by the Grand Trunk Road and camp near Hooblee, about 16 (sixteen) miles from Belgaum Fort.

3. 72nd Field Battery, Royal Artillery,  
Divisional Reserve Ammunition,  
Divisional Field Hospitals,  
Divisional Commissariat.

are attached to the Brigade for the march.

There is too  
much in No.  
4 for easy  
reference.

4. The Brigade will march at 8-30 A.M. to-morrow, following 1st Brigade.

The connecting party being furnished by the 1st Royal Warwickshire Regiment.

#### *Order of March.*

72nd Field Battery, Royal Artillery	...	...	8-30 A.M.
1st Royal Warwickshire Regiment	...	...	8-37 "
2nd Derbyshire Regiment	...	...	8-44 "
9th Regiment, Madras Infantry	...	...	8-51 "
15th Regiment, Madras Infantry	...	...	8-58 "

Light baggage consisting of—

1st Reserve Ammunition,

Water mules,

Signalling equipment,

Entrenching tools,

Field stretchers and regimental ambulance transport,

will follow their respective units.

Divisional and Brigade Reserve Ammunition, marching at 9-5 A.M., will follow immediately after the light baggage of the rear unit.

Divisional and Brigade Field Hospitals, marching at 9-15 A.M., will follow the ammunition column.

In the above order, and at the time stated, each unit will join the line of march at the railway crossing south-west of the Fort.

5. Each battalion will furnish its own flank guards. The 15th Regiment, Madras Infantry, will furnish one company as a rear guard ; also the flank guards for the trains.

6. A baggage guard of one man per company from each battalion under a non-commissioned officer will be detailed.

7. Heavy baggage consisting of—

Cooking utensils, tents, kits, supplies, spare animals, and all baggage not stated in Order No. 4,

will be handed over to the Divisional Transport Officer by 8 A.M. on the Kulladghee Road, north-east of the Fort.

8. Alarm Posts and halts will be as laid down in Standing Orders throughout the march.

9. Men will carry one day's rations complete, except meat, which will be issued as soon as practicable after arrival in camp.

10. Brigade Orders will be issued daily as soon as possible after arrival in camp. Officers Commanding Units will be informed when

- to attend on the Officer Commanding Brigade for orders.

11. The Officer Commanding Brigade will march at the head of the brigade.

By order,

R. GILCHRIST, Colonel,

*Deputy Assistant-Adjutant-General, and Brigade.*

Water  
bullocks?

Quite right  
to fix a spot.

Vide D. S. O.  
No. 2  
overlooked.

Hour quite  
correct  
because  
rendezvous  
is some  
distance from  
railway cross-  
ing mentioned  
in No. 4.  
Unnecessary  
order.

Might be  
communicat-  
ed verbally.

R. C. H.

## REGIMENTAL ORDERS.

By MAJOR H. E. IRWIN, COMMANDING 1ST ROYAL WARWICKSHIRE  
REGIMENT.

THE CLUB, BELGAUM;

4 P.M., 7th March 1899.

1. Enemy reported to be concentrated at Dharwar. So far no Not  
general rising. Natives have destroyed railway bridges, and likely absolutely  
to harass march and fire into camps. necessary.

2. The Division will march to Dharwar to-morrow by the Grand  
Trunk Road and camp near Hooblee, about 16 miles from Belgaum  
Fort.

3. The Brigade will march at 8-30 A.M. to-morrow, following the Quite right  
1st Brigade in the following order:— to omit other  
corps.

72nd Field Battery, Royal Artillery.

1st Royal Warwickshire Regiment.

4. The battalion will parade at 8-15 A.M. to-morrow and will  
join the line of march at railway crossing south-west of Fort at 8-37  
A.M.

"A" Company will form an advanced guard connecting 1st and  
2nd Brigades.

"B" and "C" Companies will form right and left flank guards  
for the battalion.

5. The first reserve ammunition—

Water mules,  
Signalling equipment,  
Entrenching tools,  
Field stretchers and regimental ambulance,

Bullocks ?

will follow in rear of the battalion.

The remainder of the baggage will be loaded up at the Regi-  
mental Quarter Guard by 7-45 A.M. under the Regimental Transport  
Officer, who will report himself with baggage at 8 A.M. to the Divi-  
sional Transport Officer on the Kulladghee Road, north-east of Fort.

A baggage guard of one non-commissioned officer and one man *vide* remark  
per company will accompany the baggage. to B. O. No. 6.

6. One day's rations, except meat, will be issued on parade, and  
carried in havresacks. The meat will be issued on arrival in camp.

7. When in camp the Regimental Quarter Guard will always be  
the Alarm Post for the battalion.

By order,

H. E. IRWIN, Major, -

for Adjutant, 1st Royal Warwickshire Regiment.

*Remarks.*

- (i) Names of places should be printed in capitals.  
 (ii) Marginal note to each order makes reference easier.

I think it causes unnecessary writing in the field.

R. C. H.

R. GILCHRIST, *Colonel.*

### BRIGADE DIVISION ORDERS.

BY LIEUTENANT-COLONEL B., COMMANDING BRIGADE DIVISION,  
 ROYAL ARTILLERY.

1ST BRIGADE CAMP,

BELGAUM;

12 noon, 7th March 1899.

1. The Division will march on Dharwar to-morrow by the Grand Trunk Road and camp near Hooblee, about 16 miles from Belgaum Fort.

2. The 49th Field Battery, Royal Artillery, will march with the 1st Brigade, the 72nd Field Battery, Royal Artillery, with the 2nd Brigade.

3. Men will carry one day's rations complete, except meat. Three days' meat and two days' rations for men will be carried in Brigade charge. Two days' grain for horses will be carried in Brigade charge, and one day's hay. One day's grain will be carried with batteries. Officers Commanding Batteries will submit early requisitions for transport, rations, and forage, and will arrange to draw one day's rations (except meat) and one day's grain from the Commissariat this afternoon.

4. All horses to be fed and watered, if possible, before starting. One feed per horse to be carried in nose-bags, and the remainder of the grain in the gram bags.

5. Officers Commanding Batteries will arrange for tea for the men before starting.

6. The 49th Field Battery will march with the main-body of the 1st Brigade and will be ready to move off at 6-55 A.M., and will follow the 21st Madras Pioneers.

7. The baggage of 1st Brigade will follow the main-body at 7-50 A.M. in the same order of march as the troops. The Officer Commanding 49th Field Battery, Royal Artillery, will detail a non-commissioned officer to take charge of the Battery baggage, who will report himself to the Brigade Transport Officer for orders at 17-40 A.M.

The meat not carried—driven.  
 Not necessary. A  
 Divisional Standing Order.  
 The Brigadier gave no starting point.

Vide D. S. O. No. 2.

*Note.*—The 26th Madras Infantry furnish a baggage guard.

8. The 72nd Field Battery will march with the main-body of the 2nd Brigade and will be ready to move off at 8-25 A.M. and will lead the 2nd Brigade. The Brigadier gave a starting point which should be stated, Too verbose.

9. The light baggage, *vis.*, water mules and ambulance transport, will march immediately in rear of the Battery. The remainder of the baggage will be handed over to the Divisional Transport Officer by 8 A.M. on the Kulladghee Road, north-east of the Fort. The Officer Commanding 72nd Field Battery will detail one non-commissioned officer to take charge of the Battery baggage, who will report himself to the Divisional Transport Officer at 7-50 A.M. for orders. Vide D. S. O. No. 2.

10. Native followers will march with the baggage, and when in camp will, on no account, be allowed to leave its limits. No natives, except followers, will be allowed in camp. Unnecessary. D. S. O. No. 11.

11. Officers Commanding Batteries will furnish parade states in pencil as early as possible each morning. Unnecessary. D. S. O. No. 5.

12. At retreat batteries will parade at their alarm posts, and all followers will be sent to the place indicated in case of attack. The alarm post for each battery will be its own gun park. R. C. H. First part unnecessary. D. S. O. No. 12.

13. All villages are out of bounds. Unnecessary. D. S. O. No. 17.

14. The Officer Commanding Brigade Division, Royal Artillery, will march with the 49th Field Battery, Royal Artillery. R. C. H.

By order,

G. HENDERSON, *Lieut., R.A.,*  
*Acting Adjutant, Royal Artillery.*

#### Remarks.

Names of places should be printed in capitals.

R. GILCHRIST, *Colonel.*

### BATTERY ORDERS.

BY LIEUTENANT G. HENDERSON, COMMANDING 72ND FIELD BATTERY, ROYAL ARTILLERY.

2ND BRIGADE CAMP,

BELGAUM;

12-30 P.M., 7th March 1892. Not possible to publish so soon after B. D. orders. What main body?

1. The Battery will march to-morrow with the main-body.

## 2. Battery will parade to-morrow as under :—

Times not too long for the first march out.	Men will turn out at	...	...	...	6-30 A.M.
	Early feed	"	...	...	6-45 "
	Boot and saddle	"	...	...	7-45 "
	Squad parade	"	...	...	8-5 "
	Ready for C. O.	"	...	...	8-20 "

3. Tea will be issued in the gun park between 6-45 A.M. and 7-45 A.M.

4. One day's rations, except meat, will be issued for each man, and one day's grain for each horse will be issued this afternoon. Nos. 1 will report themselves to Quarter-Master Sergeant and ascertain from him at what time he will issue rations and grain.

*Vide D. S. O.* 5. Every water-bottle is to be full to-morrow before starting, and  
*No. 3.* every man will carry his day's ration. Quarter-Master Sergeant will  
*R. C. H.* arrange to draw the meat ration as soon as possible after arrival in camp.

6. One feed for each horse to be carried in nose-bags and the remainder in gram bags.

*Why different from B.* 7. All baggage and line-gear to be packed and ready to move  
*D. O. No. 9?* off by 7-45 A.M.

*Where? A* 8. Corporal E. will be in charge of the Battery's baggage and will  
*long way off,* report himself to the Divisional Transport Officer at 7-40 A.M. for  
*has he to* orders.  
*return?*

*The battery moves at a* He will also be in charge of the native establishment and will  
*later hour than* muster them as soon as the battery moves off. They will accompany  
*its baggage.* the baggage.

*Corpl.*  
*E. cannot be*  
*at two places*  
*at same time.*

*Standing* 9. Water mules and ambulance transport will march immediately  
*Order.* in rear of the Battery.

*R. C. H.*

*Lieut., R.A.,*

*Commanding 72nd Field Battery, Royal Artillery.*

---

*Remarks.*

(i) Orders not signed.

*Not abso-* (ii) The situation as regards enemy and intention of Officer  
*lutely neces-* Commanding Division should be published in Battery Orders.  
*sary in orders*  
*for small*  
*units.*

*R. C. H.*

*R. GILCHRIST, Colonel.*

## DIVISIONAL AMMUNITION COLUMN ORDERS.

BY MAJOR R. E. BOOTHBY, COMMANDING.

CAMP BRITISH INFANTRY LINES,

BELGAUM;

12 noon, 7th March 1899.

1. The enemy is reported concentrating at Dharwar. Natives have destroyed the railway crossings and are likely to harass the march.

2. The Division marches on Dharwar to-morrow and will camp near Hooblee (16 miles from Belgaum Fort).

The column marches in rear of the light baggage of the rear Very clear. battalion (15th Madras Infantry) of the 2nd Brigade, which clears the railway crossing south-west of the Fort at 9-5 A.M.

3. Halts and alarm posts throughout the march will be as in Standing Orders.

4. The column will parade to-morrow as follows:—

Water and feed, 7 A.M.

Commanding Officer's parade, 8-15 A.M.

One day's rations complete, except meat, will be carried on the wagons, each native will carry a day's ration on him.

5. The Quarter-Master Sergeant with the baggage and native establishment, except the puckalli who accompanies the column, will march at 7-50 A.M., and report to the Divisional Transport Officer on the Kulladghee Road, north-east of the Fort, at 8 A.M.

Time allowed to get to railway crossing correct.

R. C. H.

2nd Brigade Orders Nos. 4 and 7 should have been followed.

R. C. H.

R. E. BOOTHBY, Major, R.A.,

Commanding Ammunition Column.

*Remarks.*

Names of places should be printed.

R. GILCHRIST, Colonel.

## SIGNALLING ARRANGEMENTS.

Signal stations during the march were posted as follows:—

Musketry Hill ... .. P. A.

Halgi Hill ... .. P. B.

Hill south of Dharwar Road between the 8th and 9th milestones from Hooblee ... .. P. D.

Hooblee (Terminal Station) ... .. C. B.

P. B. and P. D. were both found from the 1st Brigade, C. B. by the Divisional Signallers.



At 12-15 P. B. withdrew with rear guard, and at 13-15 P. D. withdrew. C. B. remained at Hooblee until the rear guard reached camp at 18 o'clock.

HOOBLEE; }  
8th March 1899.

C. E. COBB, Lieutenant,  
1st East Yorkshire Regiment,  
A. S. A. S.

*Helio message received from P. D. by C. B. at 13-20.*

X S

To

From

General Officer Commanding Division. General Officer Commanding 2nd Brigade.

Whole of rear guard passed milestone nine miles from Hooblee at thirteen-ten.

A. B. HUTCHINS, Sergeant,  
8th March 1899. 1/C. C. B.

*Helio message received from P. D. by C. B. at 16-5.*

X S

To

From

General Officer Commanding Division. General Officer Commanding 2nd Brigade.

Carts and everything coming on well. If all goes on well, I shall be in camp with rear guard at about eighteen o'clock.

A. B. HUTCHINS, Sergeant,  
8th March 1899. 1/C. C. B.

### DIARY OF PRINCIPAL MEDICAL OFFICER.

8th March 1899.

(a) Arrived at Hooblee.

(b) Extract from morning state of sick, to be forwarded to Principal Medical Officer, India, and to General Officer Commanding—

		British.	Native.
Other fevers	...	4	2
Diarrhoea and dysentery	...	10	9
Eye-diseases	...	0	6
Surgical cases	...	31	33
Other complaints	...	11	1
Total	...	56	55



3. 72nd Field Battery, Royal Artillery,  
Divisional Reserve Ammunition,  
Divisional Field Hospitals,  
Divisional Commissariat.

are attached to the Brigade for the march.

4. The Brigade will march at 8-30 A.M. to-morrow, following 1st Brigade.

The connecting party being furnished by the 1st Royal Warwickshire Regiment.

#### *Order of March.*

72nd Field Battery, Royal Artillery	...	...	8-30 A.M.
1st Royal Warwickshire Regiment	...	...	8-37 "
2nd Derbyshire Regiment	...	...	8-44 "
5th Regiment, Madras Infantry	...	...	8-51 "
15th Regiment, Madras Infantry	...	...	8-55 "

Light baggage consisting of—

1st Reserve Ammunition,

Water mules,

Sigalling equipment,

Entrenching tools,

Field stretchers and regimental ambulance transport,

will follow their respective units.

Divisional and Brigade Reserve Ammunition, marching at 9-5 A.M. will follow immediately after the light baggage of the rear unit.

Divisional and Brigade Field Hospitals, marching at 9-15 A.M. will follow the ammunition column.

In the above order, and at the time stated, each unit will join the line of march at the railway crossing south-west of the Fort.

5. Each battalion will furnish its own flank guards. The 15th Regiment, Madras Infantry, will furnish one company as a rear guard, also the flank guards for the trains.

6. A baggage guard of one man per company from each Battalion under a non-commissioned officer will be detailed.

7. Heavy baggage consisting of—

Cooking utensils, tents, kits, supplies, spare animals, and all baggage not stated in Order No. 4.

will be handed over to the Divisional Transport Officer by 8 A.M. at the Kulladghree Road, north-east of the Fort.

8. Alarm Posts and halts will be as laid down in Standing Orders throughout the march.

9. Men will carry one day's rations complete, except meat, which will be issued as soon as practicable after arrival in camp.

10. Brigade Orders will be issued daily as soon as possible after arrival in camp. Officers Commanding Units will be informed when to attend on the Officer Commanding Brigade for orders.

11. The Officer Commanding Brigade will march at the head of the brigade.

By order,

R. GILCHRIST, Colonel,

*Deputy Assistant-Adjutant-General, 2nd Brigade.*

There is too much in No. 1 for easy reference.

Water bullocks?

Quite right to fix a spot.

File D. S. O. No. 2 overlooked.

Hour quite correct. To save unnecessary is some distance from railway crossing mentioned in No. 4. Unnecessary order.

Might be communicated verbally.

R. C. H.

## REGIMENTAL ORDERS.

BY MAJOR H. E. IRWIN, COMMANDING 1ST ROYAL WARWICKSHIRE  
REGIMENT.

THE CLUB, BELGAUM ;

4 P.M., 7th March 1899.

1. Enemy reported to be concentrated at Dharwar. So far no Not  
general rising. Natives have destroyed railway bridges, and likely absolutely  
to harass march and fire into camps. necessary.

2. The Division will march to Dharwar to-morrow by the Grand  
Trunk Road and camp near Hooblee, about 16 miles from Belgaum  
Fort.

3. The Brigade will march at 8-30 A.M. to-morrow, following the Quite right  
1st Brigade in the following order :— to omit other  
72nd Field Battery, Royal Artillery. corps.  
1st Royal Warwickshire Regiment.

4. The battalion will parade at 8-15 A.M. to-morrow and will  
join the line of march at railway crossing south-west of Fort at 8-37  
A.M.

"A" Company will form an advanced guard connecting 1st and  
2nd Brigades.

"B" and "C" Companies will form right and left flank guards  
for the battalion.

5. The first reserve ammunition—

Water mules,  
Signalling equipment,  
Entrenching tools,  
Field stretchers and regimental ambulance,

Bullocks ?

will follow in rear of the battalion.

The remainder of the baggage will be loaded up at the Regi-  
mental Quarter Guard by 7-45 A.M. under the Regimental Transport  
Officer, who will report himself with baggage at 8 A.M. to the Divi-  
sional Transport Officer on the Kulladghee Road, north-east of Fort.

A baggage guard of one non-commissioned officer and one man vide remark  
per company will accompany the baggage. to B. O. No. 6.

6. One day's rations, except meat, will be issued on parade, and  
carried in havresacks. The meat will be issued on arrival in camp.

7. When in camp the Regimental Quarter Guard will always be  
the Alarm Post for the battalion.

By order,

H. E. IRWIN, Major, -

for Adjutant, 1st Royal Warwickshire Regiment.

*Remarks.*

- (i) Names of places should be printed in capitals.  
 (ii) Marginal note to each order makes reference easier.

I think it  
causes  
unnecessary  
writing in the  
field.

R. C. H.

R. GILCHRIST, *Colonel.*

**BRIGADE DIVISION ORDERS.**

BY LIEUTENANT-COLONEL B., COMMANDING BRIGADE DIVISION,  
ROYAL ARTILLERY.

1ST BRIGADE CAMP,

BELGAUM;

12 noon, 7th March 1899.

1. The Division will march on Dharwar to-morrow by the Grand Trunk Road and camp near Hooblee, about 16 miles from Belgaum Fort.

2. The 49th Field Battery, Royal Artillery, will march with the 1st Brigade, the 72nd Field Battery, Royal Artillery, with the 2nd Brigade.

The meat  
not carried—  
driven.

3. Men will carry one day's rations complete, except meat. Three days' meat and two days' rations for men will be carried in Brigade charge. Two days' grain for horses will be carried in Brigade charge, and one day's hay. One day's grain will be carried with batteries. Officers Commanding Batteries will submit early requisitions for transport, rations, and forage, and will arrange to draw one day's rations (except meat) and one day's grain from the Commissariat this afternoon.

4. All horses to be fed and watered, if possible, before starting. One feed per horse to be carried in nose-bags, and the remainder of the grain in the gram bags.

Not  
necessary. A  
Divisional  
Standing  
Order.  
The Brigadier  
gave no  
starting point.

5. Officers Commanding Batteries will arrange for tea for the men before starting.

6. The 49th Field Battery will march with the main-body of the 1st Brigade and will be ready to move off at 6-55 A.M., and will follow the 21st Madras Pioneers.

Vide D. S. O.  
No. 2.

7. The baggage of 1st Brigade will follow the main-body at 7-50 A.M. in the same order of march as the troops. The Officer Commanding 49th Field Battery, Royal Artillery, will detail a non-commissioned officer to take charge of the Battery baggage, who will report himself to the Brigade Transport Officer for orders at 17-40 A.M.

*Note.*—The 26th Madras Infantry furnish a baggage guard.

8. The 72nd Field Battery will march with the main-body of the 2nd Brigade and will be ready to move off at 8-25 A.M. and will lead the 2nd Brigade. The Brigadier gave a starting point which should be stated, Too verbose.

9. The light baggage, *vis.*, water mules and ambulance transport, will march immediately in rear of the Battery. The remainder of the baggage will be handed over to the Divisional Transport Officer by 8 A.M. on the Kulladghee Road, north-east of the Fort. The Officer Commanding 72nd Field Battery will detail one non-commissioned officer to take charge of the Battery baggage, who will report himself to the Divisional Transport Officer at 7-50 A.M. for orders. Vide D. S. O. No. 2.

10. Native followers will march with the baggage, and when in camp will, on no account, be allowed to leave its limits. No natives, except followers, will be allowed in camp. Unnecessary. D. S. O. No. 11.

11. Officers Commanding Batteries will furnish parade states in pencil as early as possible each morning. Unnecessary. D. S. O. No. 5.

12. At retreat batteries will parade at their alarm posts, and all followers will be sent to the place indicated in case of attack. The alarm post for each battery will be its own gun park. R. C. H. First part unnecessary. D. S. O. No. 12.

13. All villages are out of bounds. Unnecessary. D. S. O. No. 17.

14. The Officer Commanding Brigade Division, Royal Artillery, will march with the 49th Field Battery, Royal Artillery. R. C. H.

By order,

G. HENDERSON, *Lieut., R.A.,*  
*Acting Adjutant, Royal Artillery.*

#### Remarks.

Names of places should be printed in capitals.

R. GILCHRIST, *Colonel.*

#### BATTERY ORDERS.

BY LIEUTENANT G. HENDERSON, COMMANDING 72ND FIELD  
BATTERY, ROYAL ARTILLERY.

2ND BRIGADE CAMP,

BELGAUM;

12-30 P.M., 7th March 1899. Not possible to publish so soon after B. D. orders What main body?

1. The Battery will march to-morrow with the main-body.

## 2. Battery will parade to-morrow as under :—

Times not too long for the first march out.	Men will turn out at	...	...	...	6-30 A.M.
	Early feed	"	...	...	6-45 "
	Boot and saddle	"	...	...	7-45 "
	Squad parade	"	...	...	8-5 "
	Ready for C. O.	"	...	...	8-20 "

3. Tea will be issued in the gun park between 6-45 A.M. and 7-45 A.M.

4. One day's rations, except meat, will be issued for each man, and one day's grain for each horse will be issued this afternoon. Nos. 1 will report themselves to Quarter-Master Sergeant and ascertain from him at what time he will issue rations and grain.

*Vide* D. S. O. No. 3. R. C. H. 5. Every water-bottle is to be full to-morrow before starting, and every man will carry his day's ration. Quarter-Master Sergeant will arrange to draw the meat ration as soon as possible after arrival in camp.

6. One feed for each horse to be carried in nose-bags and the remainder in gram bags.

Why different from B. D. O. No. 9? 7. All baggage and line-gear to be packed and ready to move off by 7-45 A.M.

Where? A long way off, has he to return? 8. Corporal E. will be in charge of the Battery's baggage and will report himself to the Divisional Transport Officer at 7-40 A.M. for orders.

The battery moves at a later hour than its baggage. Corpl. E. cannot be at two places at same time. He will also be in charge of the native establishment and will muster them as soon as the battery moves off. They will accompany the baggage.

Standing Order. 9. Water mules and ambulance transport will march immediately in rear of the Battery.

R. C. H.

*Lieut., R.A.,*

*Commanding 72nd Field Battery, Royal Artillery.*

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*Remarks.*

(i) Orders not signed.

Not absolutely necessary in orders for small units. (ii) The situation as regards enemy and intention of Officer Commanding Division should be published in Battery Orders.

R. C. H.

*R. GILCHRIST, Colonel.*

## DIVISIONAL AMMUNITION COLUMN ORDERS.

By MAJOR R. E. BOOTHBY, COMMANDING.

CAMP BRITISH INFANTRY LINES,

BELGAUM;

12 noon, 7th March 1899.

1. The enemy is reported concentrating at Dharwar. Natives have destroyed the railway crossings and are likely to harass the march.

2. The Division marches on Dharwar to-morrow and will camp near Hooblee (16 miles from Belgaum Fort).

The column marches in rear of the light baggage of the rear Very clear. battalion (15th Madras Infantry) of the 2nd Brigade, which clears the railway crossing south-west of the Fort at 9.5 A.M.

3. Halts and alarm posts throughout the march will be as in Standing Orders.

4. The column will parade to-morrow as follows:—

Water and feed, 7 A.M.

Commanding Officer's parade, 8-15 A.M.

One day's rations complete, except meat, will be carried on the wagons, each native will carry a day's ration on him.

5. The Quarter-Master Sergeant with the baggage and native establishment, except the puckalli who accompanies the column, will march at 7.50 A.M., and report to the Divisional Transport Officer on the Kulladghee Road, north-east of the Fort, at 8 A.M.

Time allowed to get to railway crossing correct.

R. C. H.

2nd Brigade Orders Nos. 4 and 7 should have been followed.

R. C. H.

R. E. BOOTHBY, Major, R.A.,

Commanding Ammunition Column.

### Remarks.

Names of places should be printed.

R. GILCHRIST, Colonel.

### SIGNALLING ARRANGEMENTS.

Signal stations during the march were posted as follows:—

Musketry Hill	...	...	...	...	P. A.
Halgi Hill	...	...	...	...	P. B.
Hill south of Dharwar Road between the 8th and 9th milestones from Hooblee	...	...	...	...	P. D.
Hooblee (Terminal Station)	...	...	...	...	C. B.

P. B. and P. D. were both found from the 1st Brigade, C. B. by the Divisional Signallers.



At 12-15 P. B. withdrew with rear guard, and at 13-15 P. D. withdrew. C. B. remained at Hooblee until the rear guard reached camp at 18 o'clock.

HOOBLEE; 8th March 1899.	}	C. E. COBB, <i>Lieutenant,</i> <i>1st East Yorkshire Regiment,</i> <i>A. S. A. S.</i>
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*Helio message received from P. D. by C. B. at 13-20.*

X S

To

From

*General Officer Commanding Division.      General Officer Commanding 2nd Brigade,*

Whole of rear guard passed milestone nine miles from Hooblee at thirteen-ten.

A. B. HUTCHINS, <i>Sergeant,</i>	<i>1/C. C. B.</i>
8th March 1899.	

*Helio message received from P. D. by C. B. at 16-5.*

X S

To

From

*General Officer Commanding Division.      General Officer Commanding 2nd Brigade.*

Carts and everything coming on well. If all goes on well, I shall be in camp with rear guard at about eighteen o'clock.

A. B. HUTCHINS, <i>Sergeant,</i>	<i>1/C. C. B.</i>
8th March 1899.	

## DIARY OF PRINCIPAL MEDICAL OFFICER.

*8th March 1899.*

(a) Arrived at Hooblee.

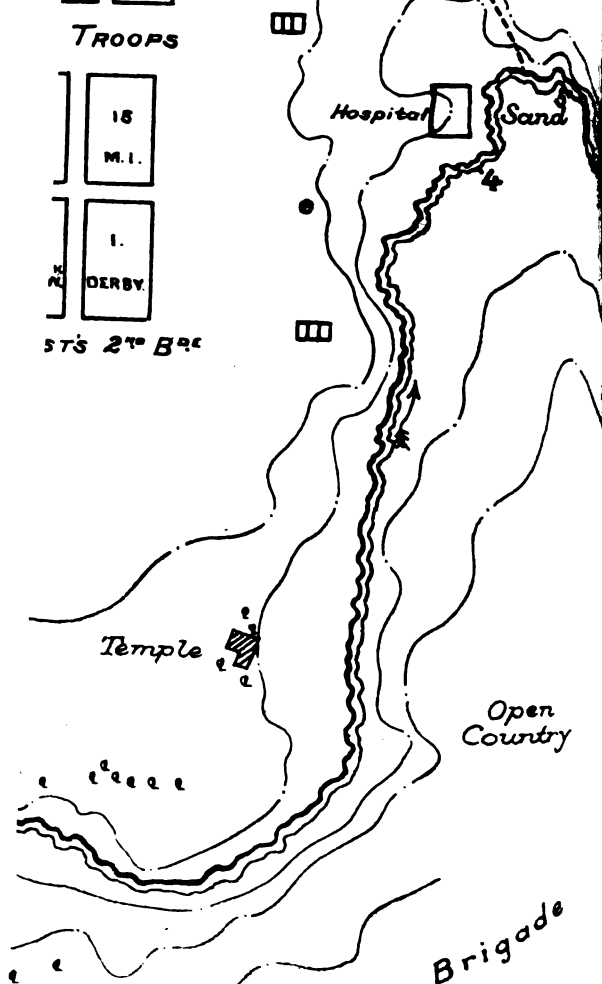
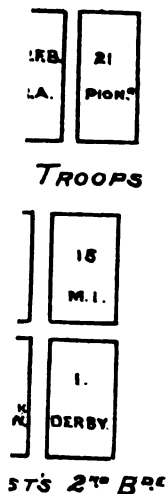
(b) Extract from morning state of sick, to be forwarded to Principal Medical Officer, India, and to General Officer Commanding—

			British.	Native.
Other fevers	...	...	4	2
Diarrhoea and dysentery	...	...	10	9
Eye-diseases	...	...	0	6
Surgical cases	...	...	31	33
Other complaints	...	...	11	5
		Total	56	55



NEAR  
**HOOBLEE.**

March 3rd.



atposts Lawford's Brigade

MAJOR C. J. COCKBURN, 1<sup>st</sup> R. War. B.

LIEUT. C. J. TAWNEY, E. Yorks. R.

March 1899.

(c) Plague reported to be in vicinity of Hooblee. Drew General Officer Commanding's attention to fact with object of posting villages out of bounds.

R. W. KNOX, *Lieut., I.M.S.,*  
Principal Medical Officer.

### STAFF DIARY.

CAMP 2 MILES S.-E. OF HOOBLEE;

8th March 1899.

For order of march see Divisional Order of 7th. The march to-day was 18 miles, as no good camping-ground at Hooblee, and there was plague in this village.

It was severe for a first march, but the road was excellent, and there was a cool breeze. The sun became powerful, but the trees along the road gave much shade. The troops on reaching the Hari Nullah (about 7 miles) formed up on the road and rested, while those in advance filed across the bridge.

The head of Lawford's Brigade reached camp at 1 P.M., and the whole division was in camp at 6 P.M., and there were no stragglers.

There is telegraphic communication along the road.

The camping-ground was excellent; the Mulpurba River, 500 yards in front, gave good water, and the high ground beyond was perfect for protection by outposts.—See Sketch.

13 o'clock Cavalry reported Sangolee-Turkod Road clear of enemy; also roads to the south of Hooblee. The Cavalry decided to remain out all night at Kittur. Three standing patrols ordered near Manowlee, Ambarguttee, and Tegur. The Cavalry to be spared as much as possible at night.

Ample supplies.

At 16-30 telegraphed to Belgaum:—"Be prepared to move all available troops on Londa."

At 17-0 received officer's patrol message, dated 15-0 o'clock, south of Hulsee:—"Enemy's Infantry at Hulsee, probably small party. Remaining out for night."

At 17-10 despatched by mounted orderly to Officer Commanding Cavalry at Kittur:—

"Early to-morrow, watch Hulsee, Kulikehree, Gungunkatte, and Nurrendra, and send officer's patrol north of Dharwar to observe Hubli Junction. Find out all you can about Dharwar and try and reach railway."

Belgaum telegraphed:—"Khanapur bridge will be repaired by evening of 9th. Detachment of enemy at Goonjee, perhaps 300."

Telegraphed to Belgaum at 18-0:—"Defend Khanapur bridge with all available troops, guns, and machine guns, but do not risk a fight at Goonjee."

At 19-0 o'clock heard from Government *via* Belgaum that Hubli Junction is occupied in force by the enemy. Unfortunately not informed when occupied. This seems a false move on part of enemy.

No enemy's Cavalry seen. Belgaum kept informed of all important news. Hostages taken from City of Belgaum and all large villages.

At 19-15 telegraphed to Belgaum :—"Send out to-morrow, 9th, three days' rations, except meat, for 4,000 Europeans and two days' for 7,500 natives, except fuel. Am leaving small post at Hooblee. Cavalry escort from here will meet convoy half way, your escort returning. Inform Hooblee when convoy starts."

Belgaum replied that it was not possible to collect the 50 odd carts required and start the convoy before 10th.

Each Brigade ordered to leave 50 men and an officer at Hooblee, to include sick and foot-sore—and two weak field troops. The whole to come on with the convoy, and to collect bullocks so as to bring the convoy to Tegur on 10th.

Chief Commissariat Officer ordered to report on local supplies at Tegur, as early as possible to-morrow, in case of accident to convoy. Meanwhile bread rations to be reduced at to-morrow's issue by one-half, but 1 lb. extra of meat to Europeans and  $\frac{1}{2}$  lb. to natives. Reconnoitring officers to ascertain from neighbouring villages the quantity of wheat and flour procurable; also rice, and whether husked or otherwise.

Principal Medical Officer to examine Tegur for field hospital in case enemy should attack on 9th or 10th.

Captain Richardson and Lieutenant Fraser to start to-night for Kittur and reconnoitre Dharwar to-morrow with assistance of Cavalry.

REGD. C. HART,  
*Assistant Adjutant-General.*

## DIVISIONAL ORDERS.

BY BRIGADIER-GENERAL R. C. HART, V.C., C.B., COMMANDING  
BELGAUM DIVISION.

HEAD-QUARTERS S.-E. OF HOOBLEE;

*Issued 4-30 P.M., 8th March 1899.*

1. The news that enemy is concentrating at Dharwar is confirmed. Our Cavalry is observing him, and apparently he has not yet landed any Cavalry. News that Hubli Junction is occupied by the enemy.
2. The Division will march to-morrow and camp at Tegur, about 15 miles from Hooblee.
3. Orders Nos. 3, 4 and 5 of yesterday hold good. The two machine guns and cyclists of Gilchrist's Brigade at disposal of Officer Commanding 1st Madras Lancers for 9th and 10th March.
4. The Divisional Commissariat Officer will form a depôt at Tegur.
5. The countersign will be communicated at retreat to all concerned.

6. Brigadier-General Hart will march at 9 A.M. and catch up the advanced guard.

By order,  
REGD. C. HART,  
*Assistant Adjutant-General.*

### REGIMENTAL ORDERS.

BY MAJOR G. S. KERRICH, COMMANDING 1ST MADRAS LANCERS.

KITTUR ;

4 P.M., 8th March 1899.

1. In accordance with Divisional Orders of to-day, a section will be posted from 6 P.M. to-day to 6 A.M. to-morrow as a standing patrol at Ambarguttee, Manowlee, and Tegur. Badly worded, there are to be 3 standing patrols.
2. The regiment will bivouac at Kittur to-night, the right half A Squadron forming the outposts. R. C. H.
3. The officer's patrol watching the railway reports parties of Infantry at Hulsee and Kulikehree.
4. The regiment will continue the march at 5-30 A.M. to-morrow on Dharwar.
5. The L. A. S. will detach an officer's patrol north of Dharwar to watch Hubli Junction at 5 A.M. to-morrow, and two field troops to report themselves to the Assistant Adjutant-General, Belgaum Division, at the same time. L. A. S. might not be understood. Slovenly English, apparently the patrol is to start at 5 A.M. not arrive at that hour.
6. On arrival at Venktapur, march outposts will be thrown out.
7. The machine guns will march with the supporting Squadron.
8. Regimental Orders Nos. 1, 2, 3, 6, 7, 9, 10, 11, 12, 13 and 14 of yesterday hold good. R. C. H.

By order,

J. BRUCE, *Lieutenant,*  
*Adjutant, 1st Madras Lancers.*

### BRIGADE ORDERS.

BY LIEUTENANT-COLONEL E. LAWFORD, COMMANDING 1ST BRIGADE, BELGAUM DIVISION.

HOOBLEE ;

4-30 P.M., 8th March 1899.

1. The news that the enemy is concentrating at Dharwar is confirmed. Our Cavalry is observing him. The enemy has not yet landed any Cavalry.

2. To march to-morrow at 6-30 A.M. and camp at Tegur, 15 miles from Hooblee.

3. The advanced guard under Lieutenant-Colonel F. will move off at 6-30 A.M.—

2nd Battalion The Welsh Regiment.  
2 Companies, Sappers.  
Interval—One mile.

4. Main-body, order of route—

The battery should not be wedged in among Infantry: its pace is quite different. The Cavalry are in front, and Battery not likely to be required in a hurry, therefore it would be a great convenience to let it march later.

R. C. H.  
Position of Brigadier not stated.

21st Pioneers	...	...	...	6-55 A.M.
49th Field Battery, Royal Artillery	...	...	...	7-2 "
1st East Yorkshire Regiment	...	...	...	7-6 "
20th Madras Infantry	...	...	...	7-13 "
26th Madras Infantry	...	...	...	7-20 "

5. Brigade Orders Nos. 7, 8, 9 and 10 of yesterday hold good.

6. On arrival at Tegur the advanced guard under Lieutenant-Colonel F. will form the outposts.

By order,

E. LAWFORD, *Lieut.-Col.*,  
for *Deputy Assistant Adjutant-General.*

## 2nd BRIGADE ORDERS.

BY COLONEL R. GILCHRIST, COMMANDING 2ND BRIGADE.

BRIGADE HEAD-QUARTERS, HOOBLEE;

4 P.M., 8th March 1899.

1. News of the enemy concentrating at Dharwar confirmed. Our Cavalry is observing him, and apparently he has not yet landed any Cavalry.

Hubli Junction occupied by the enemy.

2. The Officer Commanding Division has decided to continue the march and camp at Tegur, about 15 (fifteen) miles from Hooblee.

3. The Brigade will march at 7-30 A.M. to morrow morning, following the 1st Brigade.

This is a serious mistake, D.O. said 8-30 A.M.

The connecting party will be furnished by the 15th Regiment, Madras Infantry.

The order of march and the intervals of time will be the same as yesterday, with the exception that the 15th Regiment, Madras Infantry, will follow the 72nd Field Battery, Royal Artillery.

Each unit will join the line of march on the road, north side of the river.

4. Orders Nos. 5, 6, 7 and 9 of yesterday hold good.

The heavy baggage will be handed over to the Divisional Transport Officer by 7 A.M. on ground west of the camp. See remark against B. O.

5. The machine gun detachment and cyclists are placed at the disposal of the Officer Commanding Cavalry. No. 3. R. C. H.

6. The Officer Commanding Brigade will march at the head of the Brigade.

By order,

R. GILCHRIST, Colonel,

*Deputy Assistant Adjutant-General, 2nd Brigade.*

### REGIMENTAL ORDERS.

BY MAJOR J. JACKSON, COMMANDING 9TH MADRAS INFANTRY.

CAMP HOOBLEE ;

*4-30 P.M., 8th March 1899.*

1. News of enemy concentrating at Dharwar confirmed. Our Cavalry observing him, and apparently he has not yet landed any Cavalry. Hubli Junction occupied by enemy.

2. To continue the march and camp at Tegur, about 15 miles from Hooblee.

3. The regiment will fall in at 8-30 A.M. (except H Company) and join the line of march on the road north of river at 8-58 A.M., marching in rear of light baggage of 2nd Derbyshire Regiment. Apparently 2nd Brigade Orders give 8-30 A.M. for march, but copy sent to A. A. G. states 7-30 A.M.

4. C and D Companies, right and left flank guards.

5. H Company rear guard ; to parade so as to follow the Divisional and Brigade Field Hospitals. R. C. H. Should be worded R. O. No. 6 of yesterday holds good. R. C. H.

6. As yesterday.

7. As yesterday at 8 A.M. west of camp.

J. JACKSON, Major,

*Commandant, 9th Madras Infantry.*

### BATTALION ORDERS.

BY CAPTAIN H. HAGGARD, COMMANDING 2ND BATTALION DERBYSHIRE REGIMENT.

CAMP HOOBLEE ;

*5 P.M., 8th March 1899.*

1. News of enemy concentrating at Dharwar confirmed. Our Cavalry is observing him, and apparently he has not yet landed any Cavalry. Hubli Junction occupied by the enemy.

2. Officer Commanding Division has decided to continue the march and camp at Tegur, about 15 miles from Hooblee.

3. The battalion will parade at 8-35 A.M. and protect its own flanks.



4. "C" Company under Lieutenant Robinson will form the right flank guard.

"D" Company under Captain Brown will form the left flank guard.

Surely the animals will not be yoked up so long before they A.M. are required ?

Battalion does not parade till 8-35 A.M.

R. C. H.

By order,

H. HAGGARD, *Captain,*

*Adjutant, and Derbyshire Regiment.*

## DIVISIONAL AMMUNITION COLUMN ORDERS.

BY MAJOR R. E. BOOTHBY, COMMANDING.

CAMP HOOBLEE ;

4-30 P.M., 8th March 1899.

1. The report of the enemy's concentration at Dharwar is confirmed. His Cavalry have not been met with.

2. The Division continues its march to-morrow and will camp at Tegur (15 miles).

3. The column will march in rear of the rear regiment of the 2nd Brigade (the 9th Madras Infantry)—

Water and feed at 6-30 A.M.

Commanding Officer's parade at 7-50 A.M.

4. Rations and grain will be carried as yesterday.

Not understood. The 2nd Brigade does not begin to move till 8-30 A.M.

R. C. H.

See remark against No. 3.

R. C. H.

5. The native establishment and baggage will be handed over west of the camp at 7 A.M.

R. E. BOOTHBY, *Major, R.A.,*  
*Commanding Ammunition Column.*

### *Report of supplies purchased at Hooblee on the 8th March 1899.*

#### Native Troops—

Rice	...	...	...	...	7,100 lbs.
Salt	...	...	...	...	200 "
Fuel	...	...	...	...	7,100 "
Ghee	...	...	...	...	600 "
Dhal	...	...	...	...	1,120 "
Chillies	...	...	...	...	50 "
Onions	...	...	...	...	50 "
Turmeric	...	...	...	...	50 "
Goor	...	...	...	...	600 "
Cattle (for Europeans)	...	...	...	...	33 head.
Goats	...	...	...	...	94 "

CAMP HOOBLEE ;

8th March 1899.

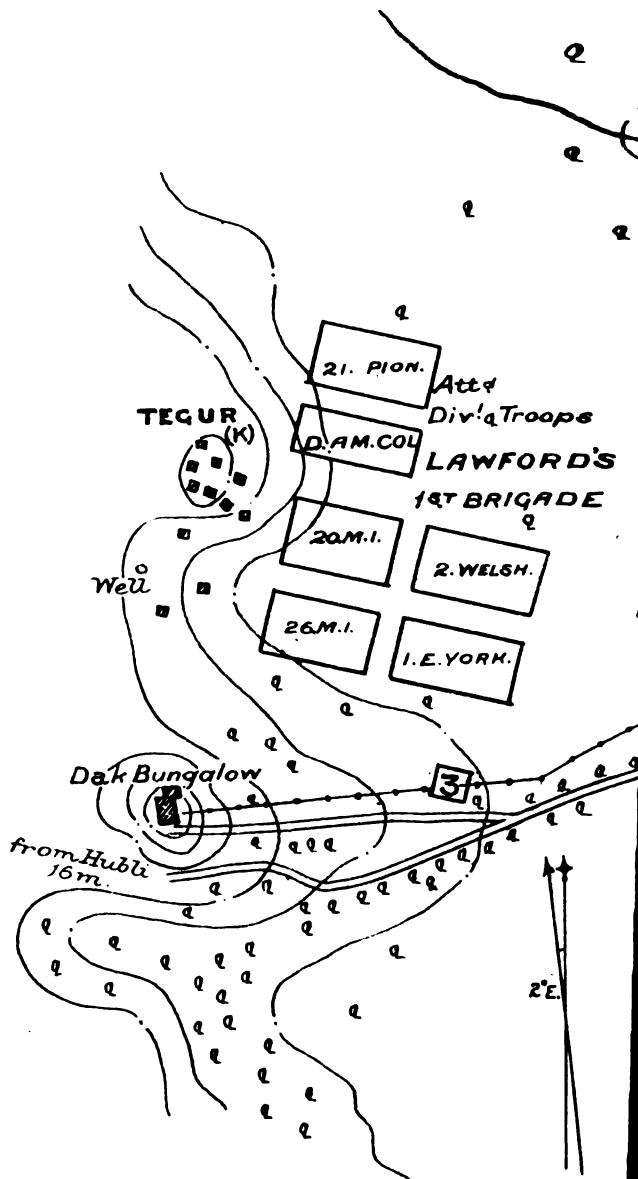
K. M. FOSS, *Lieut.-Colonel,*

*Officiating Chief Commissariat Officer.*

1

Unnecessary  
to report daily  
to P. M. O.,  
India.  
R. C. H.

Surely the animals will not be yoked up so long before they are required? Battalion does not parade till 8.35 A.M.  
R.C.H.



Not understood. The 2nd Brigade does not begin to move till 8.30 A.M.

R.C.H.  
See remark against No. 3.  
R.C.H.

*Villages in Neighbourhood small, inflammable; built no good for defence.*

*Road metalled throughout: no supply of metal condition: average width 30 feet: no gradients*

*The march for Infantry and Artillery to be confined to the main road. Cavalry in dry weather could manœuvre across country. No lateral roads for communication.*

*Telegraph Line & Wires: connecting Belgaum Hubli &*



2 y of Principal Medical Officer for 9th March 1899.

arrived at Tegur.

2 xtract from morning state of sick to be forwarded to Unnecessary  
 2 Medical Officer, India, and to General Officer Commanding, to report daily  
 2 All reporting sick at Hooblee reported to be fit for duty, with India. P. M. O.,  
 2 tion of seven British and eight Native. All fit to travel. R. C. H.  
 2 Water reported to be good, but muddy. Instructions for  
 2 e issued for purposes of cleaning the water.

No sickness in surrounding villages.

R. W. KNOX, *Lieut., I.M.S.,*  
*Principal Medical Officer.*

Att  
 Div'g Troops

LAWFORD'S

RT BRIGADE

2. WELSH.

ORN.

## STAFF DIARY.

HEAD-QUARTERS, TEGUR ;

9th March 1899.

1 or order of march to Tegur see Divisional Orders of 8th March.  
 march was 14½ to 16 miles ; road very good. Water abundant,  
 ally about Kittur. Hotter than yesterday. The names of places  
 elt differently on the different scale maps.

1 was forgotten to send back to Belgaum the empty carts, but  
 proved very useful.

The Brigades marched in the same order as on the 8th, but  
 rist's halted beyond Tegur in advance of Lawford's in order to  
 next day. The General Officer Commanding did not expect  
 iv's march to be molested in any way, nor was it.

Kittur had been an excellent halting place for the Cavalry.

At 9-30 an orderly brought a message to General Officer Com-  
 ding when he was 2 miles from Tegur, dated 8-0 A.M., 9th March,  
 magutti:—"No further information from patrols as yet. No  
 ile Cavalry visible."

For camp and outpost arrangements see sketch. Water at  
 sur very limited, and some inconvenience suffered.

At 10-0 heard from Cavalry that natives assert that hostile In-  
 try and Artillery are moving out of Dharwar on Belgaum Road.

At 11-0 Lawford ordered to send two companies, Infantry, in carts,  
 ly provisioned, except meat, to be placed under Officer Command-  
 g Cavalry towards Marmagutti, to be picked up as the Brigade  
 marches through to-morrow.

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 of metal jclists to hold ridge above Venktapur.

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S. only the  
animals will  
not be yoked  
up so long  
before they  
are required?  
Battalion  
does not  
parade till  
5-35 A.M.  
R. C. H.



*Diary of Principal Medical Officer for 9th March 1899.*

(a) Arrived at Tegur.

(b) Extract from morning state of sick to be forwarded to <sup>Unnecessary to report daily</sup> Principal Medical Officer, India, and to General Officer Commanding, <sup>to P. M. O.,</sup>

(c) All reporting sick at Hooblee reported to be fit for duty, with <sup>India.</sup> the exception of seven British and eight Native. All fit to travel. R. C. H.

(d) Water reported to be good, but muddy. Instructions for alum to be issued for purposes of cleaning the water.

(e) No sickness in surrounding villages.

R. W. KNOX, *Lieut., I.M.S.,*

*Principal Medical Officer.*

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## STAFF DIARY.

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HEAD-QUARTERS, TEGUR;

*9th March 1899.*

For order of march to Tegur see Divisional Orders of 8th March.

March was 14½ to 16 miles; road very good. Water abundant, especially about Kittur. Hotter than yesterday. The names of places are spelt differently on the different scale maps.

It was forgotten to send back to Belgaum the empty carts, but they proved very useful.

The Brigades marched in the same order as on the 8th, but Gilchrist's halted beyond Tegur in advance of Lawford's in order to lead next day. The General Officer Commanding did not expect to-day's march to be molested in any way, nor was it.

Kittur had been an excellent halting place for the Cavalry.

At 9-30 an orderly brought a message to General Officer Commanding when he was 2 miles from Tegur, dated 8-0 A.M., 9th March, Marmagutti:—"No further information from patrols as yet. No hostile Cavalry visible."

For camp and outpost arrangements see sketch. Water at Tegur very limited, and some inconvenience suffered.

At 10-0 heard from Cavalry that natives assert that hostile Infantry and Artillery are moving out of Dharwar on Belgaum Road.

At 11-0 Lawford ordered to send two companies, Infantry, in carts, fully provisioned, except meat, to be placed under Officer Commanding Cavalry towards Marmagutti, to be picked up as the Brigade marches through to-morrow.

Gilchrist ordered to send on one battalion with machine guns and cyclists to hold ridge above Venktapur.

At 11-0 news from Government, through Belgaum, that enemy was retrograding from Hubli Junction yesterday. This was expected by General Officer Commanding. Government states that Junction is wrecked, estimates enemy's detachment at two battalions; also that up

to date some 10,000 men landed at Goa. There have been disturbances in Mysore and Hyderabad—bungalows burnt. Two battalions, British Infantry, and one battalion, Sikhs, will reach Belgaum early on 11th. Khanapur Bridge cannot be repaired before noon 10th.

Much flour was found at Kittur, so full ration of bread was issued. Paying a liberal price, no difficulty about supplies. Well managed by Commissariat and Civil authorities.

13-15 o'clock Commissariat ordered to arrange with contractors for four days' supplies at Hooblee, Kittur, and Tegur. This is in case of having to fall back slowly on Belgaum.

Patel of Tegur went over to the enemy, so his house was wrecked.

At 15-45 o'clock news that enemy's Infantry and Artillery had advanced on Marmagutti, and Major Kerrich had been obliged to fall back and abandon the position, but he was strongly posted at Hehgeree.

The plans for 10th not divulged in Divisional Orders. The march to be made in order of battle, Gilchrist leading, Divisional troops re-arranged. The march will be somewhat of a flank march, but the danger is more apparent than real, as the country is difficult on the right or dangerous flank, and the Cavalry are on that flank. There are roads to the east of the main road always available in case of necessity.

At 16-40 sent cyclist with orders to Officer Commanding Hooblee:—"March to-morrow, 10th, at 6-30 A.M., with all Infantry, to Tegur. Hire carts, if possible, to carry them. Officer Commanding Cavalry detachment to arrange for fresh bullocks for convoy at Hooblee. Fresh bullocks ready here. He is to press on to the front, and after handing over convoy at Marmagutti, he is to rejoin his regiment on Dharwar Road."

Received at 19 o'clock news from Officer Commanding Cavalry, dated 18-0, 9th March, west of Marmagutti:—"Patrol near Kullapur, 4 miles south-east of Tegur, captured six of enemy's Cavalry, their horses in wretched condition, more Cavalry down the valley, but they show no enterprise. Cavalry seen at Nurrendra. Prisoners state about 400 Cavalry landed on 7th and railed to Dharwar on 8th. Horses in poor condition. Withdrawn Cavalry for night behind Infantry on Dharwar Road, except one standing patrol, 1 mile in advance of Infantry post at Hehgeree."

At 19-0 o'clock the telegraph was cut, fortunately just got through cypher message to Officer Commanding Belgaum:—

"I propose attacking Dharwar early on 11th, move all available troops early to-morrow on Londa to co-operate as best you can. Leave no effective men in Fort. Do not attack Goonjee till promised reinforcements reach you. If successful at Dharwar, I shall send three squadrons to you. You can assist me greatly by pressure on Londa."

REGD. C. HART,

*Assistant Adjutant-General.*

## DIVISIONAL ORDERS.

---

BY BRIGADIER-GENERAL R. C. HART, V.C., C.B., COMMANDING  
BELGAUM DIVISION.

HEAD-QUARTERS, TEGUR ;

*Issued 4 P.M., 9th March 1899.*

1. Gilchrist's Brigade, with Brigade Division, Royal Artillery, attached, will commence to move at 7-0 to-morrow, and will drive the enemy out of Marmagutti. Further instructions will be given in the field.

2. Lawford's Brigade will move at 8-0.

3. The Cavalry to remain in touch with the enemy, but mostly well to the west of the road.

4. Two companies, Sappers, to move at 9-30.

5. Divisional Staff baggage, heavy baggage of all units in order of march, under Divisional Transport Officer, to march immediately in rear of the Sappers.

6. Wing of 21st Pioneers immediately in rear of transport, followed by Divisional Reserve Ammunition Column, Divisional Field Hospitals, Rear Wing of 21st Pioneers. Arrangements being made by all concerned to fall into line of march opportunely.

7. The Principal Medical Officer to report on vicinity of Marmagutti for a Field Hospital.

8. The Assistant Quarter-Master-General and Commanding Royal Engineer to report on defensive position at Marmagutti according to verbal instructions.

9. The General Officer Commanding will march at 7-0 and catch up the advanced guard.

By order,

REGD. C. HART,

*Assistant Adjutant-General.*

## REGIMENTAL ORDERS.

---

BY MAJOR G. S. KERRICH, COMMANDING 1ST MADRAS LANCERS.

VENKTAPUR ;

*4 P.M., 9th March 1899.*

1. In accordance with Divisional Orders of to-day, the regiment will march at 7 A.M. to-morrow in front of the 2nd Brigade.

2. As soon as the 2nd Brigade forms to attack Marmagutti, the regiment will concentrate on its right flank,

Could not  
have been  
issued at same  
hour as  
Divisional  
Orders.

R. C. H.



Londa-  
Dharwar  
railway.

R. C. H.

3. Should Marmagutti be captured, the regiment will march to the Ramapoor valley to watch the Belgaum-Londa railway.

4. The two companies, Infantry, will hold Hehgeree to-morrow.

5. Regimental Orders Nos. 1, 2, 3, 6, 7, 9, 10, 11, 13 and 14 of the 7th instant hold good.

6. The regiment will bivouac at Venktapur to-night, one company, Infantry, forming the outposts.

7. The baggage will march with the baggage of the 2nd Brigade.

By order,

J. BRUCE, *Lieutenant,*  
*Adjutant, 1st Madras Lancers.*

### BRIGADE ORDERS.

BY LIEUTENANT-COLONEL E. LAWFORD, COMMANDING 1ST BRIGADE, BELGAUM DIVISION.

TEGUR;

4 P.M., 9th March 1899.

Divisional  
Orders were  
issued at this  
hour.

R. C. H.

1. The enemy is reported to be retrograding from Hubli Junction.

Would  
mislead every  
one into  
supposing  
that Lawford's  
Brigade had  
to do this.

R. C. H.

2. To advance on Marmagutti and drive the enemy out.

3. Gilchrist's Brigade moves at 7 A.M. with Brigade Division, Royal Artillery, attached. The machine guns and cyclists join him on the march.

Lawford's Brigade moves at 8 A.M. complete—

Nos. 2 and  
3 might have  
been combin-  
ed and this  
numbered as  
a distinct  
order.

R. C. H.

20th Madras Infantry	...	...	... 8 A.M.
26th Madras Infantry	...	...	... 8-7 "
2nd Welsh Regiment	...	...	... 8-14 "
1st East Yorkshire Regiment	...	...	... 8-21 "
Field Hospitals	...	...	... 8-28 "

The 20th Madras Infantry will keep up communication with Gilchrist's Brigade.

What orders  
for the light  
baggage?  
Brigade  
Orders as to  
time and place  
for heavy  
baggage?

R. C. H.

4. The Madras Sappers move at 9-30 A.M., followed by the Divisional Staff baggage, heavy baggage of units in order of march, under Divisional Transport Officer.

5. The wing of the 21st Madras Pioneers moves immediately in rear of the transport, followed by the Reserve Ammunition Column, Divisional Field Hospitals, Rear Wing, 21st Madras Pioneers. Not necessary to insert this. R. C. H.

6. The General Officer Commanding Division marches at 7 A.M., 2nd catches up the advanced guard.

The General Officer Commanding 1st Brigade marches at the head of his Brigade.

By order,

E. LAWFORD, *Lieut.-Col.*,

*Deputy Assistant Adjutant and Quarter-Master-General,*  
*1st Brigade.*

### BRIGADE ORDERS.

BY COLONEL R. GILCHRIST, COMMANDING 2ND BRIGADE, BELGAUM DIVISION.

"ON THE MARCH";

11-30 A.M., 9th March 1899.

1. The 15th Regiment, Madras Infantry, will occupy the ridge in advance of the village of Venktapur, with machine guns and cyclists. Issued in consequence of a D. O. sent back from Tegur. R. C. H.
2. The remainder of the Brigade will camp in rear of the village on east side of the main road.

By order,

R. GILCHRIST, *Colonel*,

*Deputy Assistant Adjutant-General, 2nd Brigade.*

### BRIGADE ORDERS.

BY COLONEL R. GILCHRIST, COMMANDING 2ND BRIGADE, BELGAUM DIVISION.

BRIGADE HEAD-QUARTERS,

TEGUR;

5 P.M., 9th March 1899.

1. Enemy retrograding from Hooblee.
2. The Officer Commanding Division has decided to continue the march, and to clear Marmagutti of the enemy.

3. The advanced guard of the Brigade will move off at 7 A.M. to-morrow morning followed by remainder of the Brigade. The Brigade Division, Royal Artillery, is attached to the Brigade, and the machine gun detachment and cyclists will rejoin on the march.

The seven words from morning in line 2 are unnecessary.

R. C. H.

### Order of March.

The Brigade is not concentrated, therefore it should be stated that the different corps are to pass a certain point at the hours named.

R. C. H.

A small force on the line of march will not require its guns in a hurry, and it is a great convenience to mounted troops to march not unnecessarily early. The guns could trot the length of the column in a few minutes.

R. C. H.

Heavy baggage does not move till after 9-30. Bullocks will of course be unyoked.

R. C. H.

Advanced Guard ... { 3 Companies, 2nd Derbyshire Regiment... 7 A.M.  
Cyclists and two machine guns.

Main-body	...	{	Brigade Division, Royal Artillery	... 7-15 A.M.
			2nd Derbyshire Regiment	... 7-22 "
			1st Royal Warwickshire Regiment	... 7-29 "
			9th Regiment, Madras Infantry	... 7-36 "
			15th Regiment, Madras Infantry	... 7-42 "
			Brigade Field Hospital	... 7-49 "

4. Light baggage to follow in rear of their respective units.

Heavy baggage will be handed over to the Divisional Transport Officer at 6-30 A.M. on the road immediately west of the camp.

5. Officer Commanding Brigade will march at the head of the Main-body.

By order,

R. GILCHRIST, Colonel,

Deputy Assistant Adjutant-General, 2nd Brigade.

### REGIMENTAL ORDERS.

By MAJOR H. E. IRWIN, COMMANDING 1ST ROYAL WARWICKSHIRE REGIMENT.

CAMP TEGUR;

6 P.M., 9th March 1899.

1. Enemy retrograding from Hubli Junction.

2. March will be continued and Marmagutti cleared of enemy.

3. The battalion will parade at 7-10 A.M. to-morrow and will join the line of march at 7-29 A.M., following the Derbyshire Regiment. Flank guards as usual.

4. One day's cooked rations will be issued on parade and carried in haversacks.

If there is a fair prospect of being able to cook the meat, it had better be raw.  
R. C. H.

5. Light baggage as usual. Heavy baggage to be loaded up in front of Regimental Quarter Guard by 6-25 A.M., and handed over to Divisional Transport Officer by 6-30 A.M. on road to right of camp.

The Brigade Transport Officer hands over to the Divisional.  
R. C. H.

6. 150 rounds of ammunition per man will be carried. This will be issued to-night from 1st Reserve under company arrangements. The 1st Reserve will fill up to-night from 2nd Reserve.

It would be better to consult the Brigadier before ordering extra ammunition to be carried. A serious action is hardly imminent.  
R. C. H.

By order,

H. E. IRWIN, *Major,*

*for Adjutant, 1st Royal Warwickshire Regiment.*

### *Report of supplies purchased at Kittur, 9th March 1899.*

#### NATIVE RATIONS.

	lbs.
Rice—16 cart-loads at 7 bags per cart, each bag=100 lbs. (at 15 seers per rupee).	11,200
Dhal—(At 13 seers per rupee) ... ..	300
Ghee—(At 9-8-0 per maund) ... ..	1,000

#### ANIMALS' RATIONS.

	lbs.
Gram—(At 14 seers per rupee) ... ..	2,000
Coolthi—(At 20 seers per rupee) ... ..	2,000
Country carts procurable ... ..	40

Information supplied by Kullundawrah, Police Patel. Translated by M. L. Ukli, Schoolmaster.

CAMP TEGUR;

9th March 1899.

K. M. FOSS, *Lieutenant-Colonel,*

*Officiating Chief Commissariat Officer.*

### PRINCIPAL MEDICAL OFFICER'S DIARY.

*10th March 1899.*

(a) Arrived at camp, 3½ miles from Dharwar,

(b) Verbal instructions issued to Major Thomson, R.A.M.C., to leave at Marmagutti two medical officers, four subordinates, and necessary medicines and followers to complete half a field hospital.

(c) Selected huts in Marmagutti village for wounded.

(d) Morning state of sick forwarded to Principal Medical Officer and General Officer Commanding.

(e) Nominal roll of wounded to Principal Medical Officer and General Officer Commanding—

British.	Native.	Enemy.
78	21	81

(f) Water very scarce and of bad quality.

R. W. KNOX, *Lieut., I.M.S.*,

*Principal Medical Officer.*

### VERBAL ORDERS DELIVERED ON THE MARCH.

BY COLONEL R. GILCHRIST, COMMANDING 2ND BRIGADE.

254TH MILESTONE, DHARWAR ROAD;

10 A.M., 10th March 1899.

1. Enemy has taken up a strong position at Marmagutti village (south of 255th milestone) on a steep knoll running north and south. Enemy's strength estimated at 1,500. They have Artillery—but number of guns uncertain.

2. The Officer Commanding Brigade determines to attack the position and cut the enemy off their line of retreat from Dharwar.

4. General Plan of Attack.

The Brigade Division, Royal Artillery, will take up a position at about 1,800 yards due north of the village—

5. 1st Line ... 2nd Derbyshire Regiment.

2nd Line ... 1st Royal Warwickshire Regiment.

3rd Line (General Reserve). 15th Regiment, Madras Infantry, and cyclists.

Flank Attack ... 9th Regiment, Madras Infantry, and two machine guns (under Major Jackson, 9th Madras Infantry).

6. (a) The Direct Attack will be delivered on the north-west front of the village.

(b) The Flank Attack :—The officer in command will move under cover to a ridge about 1 (one) mile south-east of the village and take up a position covering the Dharwar Road and the general line of retreat of the enemy. Further instructions will be delivered verbally later.

7. The Medical Officer in charge of Field Hospitals will select a suitable position for his hospital.

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- B.—Mile stone.
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- D.—Land mark  
4 Mango tre

to date some 10,000 men landed at Goa. There have been disturbances in Mysore and Hyderabad—bungalows burnt. Two battalions of British Infantry, and one battalion, Sikhs, will reach Belgaum early on 11th. Khanapur Bridge cannot be repaired before noon 10th.

Much flour was found at Kittur, so full ration of bread was issued. Paying a liberal price, no difficulty about supplies. Well managed by Commissariat and Civil authorities.

13-15 o'clock Commissariat ordered to arrange with contractors for four days' supplies at Hooilee, Kittur, and Tegur. This is a case of having to fall back slowly on Belgaum.

Patel of Tegur went over to the enemy, so his house was wrecked.

At 15-45 o'clock news that enemy's Infantry and Artillery had advanced on Marmagutti, and Major Kerrich had been obliged to fall back and abandon the position, but he was strongly posted at Helgerce.

The plans for 10th not divulged in Divisional Orders. The march to be made in order of battle, Gilchrist leading. Days' troops re-arranged. The march will be somewhat of a flank march, but the danger is more apparent than real, as the country is difficult on the right or dangerous flank, and the Cavalry are on the flank. There are roads to the east of the main road always available in case of necessity.

At 16-40 sent cyclist with orders to Officer Commanding Hooilee:—"March to-morrow, 10th, at 6-30 A.M., with all Infantry to Tegur. Hire carts, if possible, to carry them. Officer Commanding Cavalry detachment to arrange for fresh bullocks for convoy at Hooilee. Fresh bullocks ready here. He is to press on to the front, and after handing over convoy at Marmagutti, he is to remain in position on Dharwar Road."

Received at 19 o'clock news from Officer Commanding Cavalry dated 18-0, 9th March, west of Marmagutti:—"Patrol near Belgaum, 4 miles south-east of Tegur, captured six of enemy's Cavalry, 100 horses in wretched condition, more Cavalry down the valley, but they show no enterprise. Cavalry seen at Surrendra. Prisoners of war about 400 Cavalry landed on 7th and raised to Dharwar early. Horses in poor condition. Withdrawn Cavalry for night 10th. Infantry on Dharwar Road, except one standing patrol, 1 mile in advance of Infantry post at Helgerce."

At 19-0 o'clock the telegraph was cut, fortunately just got the cypher message to Officer Commanding Belgaum—

"I propose attacking Dharwar early on 11th, move all available troops early to-morrow on Londa to co-operate as best you can. Leave no effective men in Fort. Do not attack Goa until promised reinforcements reach you. If successful at Dharwar, I shall send three squadrons to you. You can assist me greatly by preventing Londa."

REGD. C. HART,

*Assistant Adjutant-General*

## DIVISIONAL ORDERS.

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BY BRIGADIER-GENERAL R. C. HART, V.C., C.B., COMMANDING  
BELGAUM DIVISION.

HEAD-QUARTERS, TEGUR;

*Issued 4 P.M., 9th March 1899.*

1. Gilchrist's Brigade, with Brigade Division, Royal Artillery, attached, will commence to move at 7-o to-morrow, and will drive the enemy out of Marmagutti. Further instructions will be given in the field.

2. Lawford's Brigade will move at 8-o.

3. The Cavalry to remain in touch with the enemy, but mostly well to the west of the road.

4. Two companies, Sappers, to move at 9-30.

5. Divisional Staff baggage, heavy baggage of all units in order of march, under Divisional Transport Officer, to march immediately in rear of the Sappers.

6. Wing of 21st Pioneers immediately in rear of transport, followed by Divisional Reserve Ammunition Column, Divisional Field Hospitals, Rear Wing of 21st Pioneers. Arrangements being made by all concerned to fall into line of march opportunely.

7. The Principal Medical Officer to report on vicinity of Marmagutti for a Field Hospital.

8. The Assistant Quarter-Master-General and Commanding Royal Engineer to report on defensive position at Marmagutti according to verbal instructions.

9. The General Officer Commanding will march at 7-o and catch up the advanced guard.

By order,

REGD. C. HART,

*Assistant Adjutant-General.*

## REGIMENTAL ORDERS.

---

BY MAJOR G. S. KERRICH, COMMANDING 1ST MADRAS LANCERS.

VENKTAPUR;

*4 P.M., 9th March 1899.*

1. In accordance with Divisional Orders of to-day, the regiment will march at 7 A.M. to-morrow in front of the 2nd Brigade.

2. As soon as the 2nd Brigade forms to attack Marmagutti, the regiment will concentrate on its right flank,

Could not  
have been  
issued at same  
hour as  
Divisional  
Orders.

R. C. H.



Londa-  
Dharwar  
railway.

R. C. H.

3. Should Marmagutti be captured, the regiment will march to the Ramapoor valley to watch the Belgaum-Londa railway.

4. The two companies, Infantry, will hold Hebgere to-morrow.

5. Regimental Orders Nos. 1, 2, 3, 6, 7, 9, 10, 11, 13 and 14 the 7th instant hold good.

6. The regiment will bivouac at Venktapur to-night, one company, Infantry, forming the outposts.

7. The baggage will march with the baggage of the 2nd Pioneer

By order,

J. BRUCE, *Lieutenant.*

*Adjutant, 1st Madras Cavalry.*

### BRIGADE ORDERS.

BY LIEUTENANT-COLONEL E. LAWFORD, COMMANDING 1ST BRIGADE, BELGAUM DIVISION.

TELEGRAM.

4 P.M., 24th March 1901.

Divisional  
Orders were  
issued at this  
hour.

R. C. H.

1. The enemy is reported to be retrograding from Hebgere to Marmagutti.

What  
orders were  
issued every  
day.

Orders were  
issued every  
day.

R. C. H.

2. To advance on Marmagutti and drive the enemy out.

Orders were  
issued every  
day.

R. C. H.

3. Gilchrist's Brigade moves at 7 A.M. with Brigade I. Royal Artillery, attached. The machine guns and cyclists are on the march.

Lawford's Brigade moves at 8 A.M. complete—

Orders were  
issued every  
day.

R. C. H.

Orders were  
issued every  
day.

R. C. H.

Orders were  
issued every  
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R. C. H.

Orders were  
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R. C. H.

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R. C. H.

Orders were  
issued every  
day.

R. C. H.

The 20th Madras Infantry will keep up communication with Gilchrist's Brigade.

Orders were  
issued every  
day.

R. C. H.

Orders were  
issued every  
day.

R. C. H.

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Orders were  
issued every  
day.

R. C. H.

5. The wing of the 21st Madras Pioneers moves immediately in rear of the transport, followed by the Reserve Ammunition Column, Divisional Field Hospitals, Rear Wing, 21st Madras Pioneers.

6. The General Officer Commanding Division marches at 7 A.M., and catches up the advanced guard.

The General Officer Commanding 1st Brigade marches at the head of his Brigade.

By order,

E. LAWFORD, *Lieut. Col.*,

*Deputy Assistant Adjutant and Quarter-Master-General,  
1st Brigade.*

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### BRIGADE ORDERS.

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BY COLONEL R. GILCHRIST, COMMANDING 2ND BRIGADE, BELGAUM DIVISION.

"ON THE MARCH";

11-30 A.M., 9th March 1899.

1. The 15th Regiment, Madras Infantry, will occupy the ridge in advance of the village of Venktapur, with machine guns and cyclists.
2. The remainder of the Brigade will camp in rear of the village on east side of the main road.

Issued in consequence of a D. O. sent back from Tegur.  
R. C. H.

By order,

R. GILCHRIST, *Colonel*,

*Deputy Assistant Adjutant-General, 2nd Brigade.*

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### BRIGADE ORDERS.

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BY COLONEL R. GILCHRIST, COMMANDING 2ND BRIGADE, BELGAUM DIVISION.

BRIGADE HEAD-QUARTERS,

TEGUR;

5 P.M., 9th March 1899.

1. Enemy retrograding from Hooblee.
2. The Officer Commanding Division has decided to continue the march, and to clear Marmagutti of the enemy.

The seven words from morning in line 2 are unnecessary.

R. C. H.

The Brigade is not concentrated, therefore it should be stated that the different troops are to pass a certain point at the hours named.

R. C. H.

A small force on the line of march will not require its guns in a hurry, and it is a great convenience to mounted troops to march not unnecessarily early. The guns could not follow the length of the column in a few minutes.

R. C. H.

Heavy baggage does not move till after 9 A.M. Packs will of course be unpacked.

R. C. H.

3. The advanced guard of the Brigade will move off at 7 A.M. to-morrow morning followed by remainder of the Brigade. The Brigade Division, Royal Artillery, is attached to the Brigade, and the machine gun detachment and cyclists will rejoin on the march.

#### *Order of March.*

Advanced Guard ... { 3 Companies, and Derbyshire Regiment ... 7 A.M.  
Cyclists and two machine guns.

Main-body ... { Brigade Division, Royal Artillery ... 7.15 A.M.  
and Derbyshire Regiment ... 7.22 .  
1st Royal Warwickshire Regiment ... 7.31 .  
9th Regiment, Madras Infantry ... 7.44 .  
15th Regiment, Madras Infantry ... 7.51 .  
Brigade Field Hospital ... 7.59 .

4. Light baggage to follow in rear of their respective units.

Heavy baggage will be handed over to the Divisional Transport Officer at 6.30 A.M. on the road immediately west of the camp.

5. Officer Commanding Brigade will march at the head of the Main-body.

By order,

R. GILCHRIST, *Colonel*

*Deputy Assistant Adjutant-General, and Engineer.*

#### REGIMENTAL ORDERS.

BY MAJOR H. E. IRWIN, COMMANDING 1ST ROYAL WARWICKSHIRE REGIMENT.

CAMP TEGUR,

6 P.M., 24 March 1917

1. Enemy retreating from Haba Junction.

2. March will be continued and Marmagutti cleared of enemy.
3. The battalion will parade at 7-10 A.M. to-morrow and will join the line of march at 7-29 A.M., following the Derbyshire Regiment. Flank guards as usual.
4. One day's cooked rations will be issued on parade and carried in haversacks. If there is a fair prospect of being able to cook the meat, it had better be raw.  
R. C. H.
5. Light baggage as usual. Heavy baggage to be loaded up in front of Regimental Quarter Guard by 6-25 A.M., and handed over to Divisional Transport Officer by 6-30 A.M. on road to right of camp. The Brigade Transport Officer hands over to the Divisional.  
R. C. H.
6. 150 rounds of ammunition per man will be carried. This will be issued to-night from 1st Reserve under company arrangements. The 1st Reserve will fill up to-night from 2nd Reserve. It would be better to consult the Brigadier before ordering extra ammunition to be carried. A serious action is hardly imminent.  
R. C. H.
- By order,  
H. E. IRWIN, *Major,*  
*for Adjutant, 1st Royal Warwickshire Regiment.*

*Report of supplies purchased at Kittur, 9th March 1899.*

NATIVE RATIONS.

	lbs.
Rice—16 cart-loads at 7 bags per cart, each bag=100 lbs. (at 15 seers per rupee).	11,200
Dhal—(At 13 seers per rupee) ... ..	300
Ghee—(At 9-8-0 per maund) ... ..	1,000

ANIMALS' RATIONS.

	lbs.
Gram—(At 14 seers per rupee) ... ..	2,000
Coolthi—(At 20 seers per rupee) ... ..	2,000
Country carts procurable ... ..	40

Information supplied by Kullundawrah, Police Patel. Translated by M. L. Ukli, Schoolmaster.

CAMP TEGUR; } K. M. FOSS, *Lieutenant-Colonel,*  
9th March 1899. } *Officiating Chief Commissariat Officer.*

PRINCIPAL MEDICAL OFFICER'S DIARY.

*10th March 1899.*

(a) Arrived at camp, 3½ miles from Dharwar,

(b) Verbal instructions issued to Major Thomson, R.A.M.C. to leave at Marmagutti two medical officers, four subordinates and necessary medicines and followers to complete half a field hospital.

(c) Selected huts in Marmagutti village for wounded.

(d) Morning state of sick forwarded to Principal Medical Officer and General Officer Commanding.

(e) Nominal roll of wounded to Principal Medical Officer and General Officer Commanding—

British.	Native.	Enemy
78	21	81

(f) Water very scarce and of bad quality.

R. W. KNOX, *Lieut., I.M.S.*

*Principal Medical Officer*

## VERBAL ORDERS DELIVERED ON THE MARCH

BY COLONEL R. GILCHRIST, COMMANDING 2ND BRIGADE

254TH MILESTONE, DHARWAR ROAD

10 A.M., 10th March 1899

1. Enemy has taken up a strong position at Marmagutti village (south of 255th milestone) on a steep knoll running north and south. Enemy's strength estimated at 1,500. They have Artillery—number of guns uncertain.

2. The Officer Commanding Brigade determines to attack this position and cut the enemy off their line of retreat from Dharwar.

4. General Plan of Attack.

The Brigade Division, Royal Artillery, will take up a position about 1,800 yards due north of the village—

5. 1st Line ... 2nd Derbyshire Regiment.

2nd Line ... 1st Royal Warwickshire Regiment.

3rd Line (General Reserve). 15th Regiment, Madras Infantry, and cyclists.

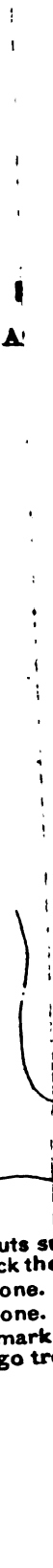
Flank Attack ... 9th Regiment, Madras Infantry, and machine guns (under Major James 9th Madras Infantry).

6. (a) The Direct Attack will be delivered on the north-west front of the village.

(b) The Flank Attack.—The officer in command will move to cover to a ridge about 1 (one) mile south-east of the village and take up a position covering the Dharwar Road and the general line of retreat of the enemy. Further instructions will be delivered verbally later.

7. The Medical Officer in charge of Field Hospitals will select a suitable position for his hospital.

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- A.—Mud Huts set  
by thick the  
B.—Mile stone.  
C.—Mile stone.  
D.—Land mark  
4 Mango tree



The trains accompanying the Brigade will form in rear of the 3rd line or General Reserve.

8. The Officer Commanding Brigade will be with the Reserve during the attack.

By order,

R. GILCHRIST, *Colonel,*  
*Deputy Assistant Adjutant-General, 2nd Brigade.*

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### BRIGADE ORDERS.

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BY LIEUTENANT-COLONEL E. LAWFORD, COMMANDING 1ST BRIGADE, BELGAUM DIVISION.

2 MILES EAST OF MARMAGUTTI;

5 P.M., 10th March 1899.

1. (a) The enemy is occupying Dharwar in force. Country open to the east and undulating. A stream, nearly dry, runs nearly parallel to our position north and south, and 1,000 yards from it to the east.

(b) Gilchrist's Brigade continues our line of outposts from our right, due south, and has charge of the Grand Trunk Road.

2. The outposts are to resist any attack made by the enemy.

3. The line to be taken up is the cross-road from the Grand Trunk Road, Marmagutti-Dharwar,  $3\frac{1}{2}$  miles from Dharwar, running due north for one mile, up to village of Nurrendra—

1st Section—Commanding, Major Bagnall.

Troops—1st East Yorkshire Regiment.

2nd Section—Commanding, Major G.

Troops—2nd Welsh Regiment.

3rd Section—Commanding, Captain Firth.

Troops—20th Madras Infantry.

Line to be divided into three sections, Nos. 1, 2 and 3. Sections to be numbered from the left of the Brigade. Each section covering a front of 600 yards.

5. Each section will patrol the stream in its front, communicating with the sections right and left.

6. In case of attack, if driven in, the piquets and patrols will clear the front by the left flank.

7. The 26th Madras Infantry under Lieutenant Pritchard will form the reserve, and will be placed 600 yards in rear of the centre of the outpost line.

8. An examining post on the Dharwar road will be furnished by Gilchrist's Brigade.

9. The line of resistance is the Dharwar cross-road to Nurrendra.

10. Reports from each piquet to be sent in hourly.



11. Signalling communication will be kept up between each portion of the outpost line.
12. The Brigadier will be with the Reserve.
13. Countersign—Bellary.

By order,

E. LAWFORD, *Lieut.-Col.*,

*Deputy Assistant Adjutant and Quarter-Master-General,  
1st Brigade.*

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### STAFF DIARY.

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HEAD-QUARTERS,

DHARWAR AND NURRENDRA CROSS ROADS;  
*10th March 1899.*

Telegraph restored at 10-0. Two villages burnt.

The Division marched to-day to within about 4 miles of Dharwar, where Nurrendra road turns off, about 8 miles.—See Divisional Orders.

There was an advanced guard action at Marmagutti, the arrangements for attack are described by Colonel Gilchrist, page 154, and *vide* sketch. While attack was in progress, all troops and baggage in rear closed up and rested.

The attack was successful, some 200 killed and wounded on our side, returns later. Enemy's losses rather less. The 9th Madras Infantry suffered severely, as the enemy opened with machine guns screened behind the hill.

The General Officer Commanding considers the Brigadier might have deployed on a broader front, and in an advanced guard action might have dispensed with a 3rd line, as Lawford's Brigade was close in support if required, and, further, the 9th Madras Infantry were very isolated, and if they could turn the position, the whole Brigade might have done so, and manœuvred the enemy out of the position without so much loss. The General Officer Commanding considers the flank march of the 9th Madras Infantry exposed it to great risk. The Artillery was well placed. The General Officer Commanding thinks that the enemy might have been manœuvred out of his position much better by taking the whole Brigade round the other flank, and at the same time turning the ridge behind, which, as it was, had later to be approached with caution as the enemy's whole army might have been in position.

The enemy fell back on Dharwar making a show on the ridge referred to, which delayed our advance quite another hour.

At 13-0 o'clock received news from Belgaum that railway in working order to within 4 miles of Goonjee, which is observed by Infantry.

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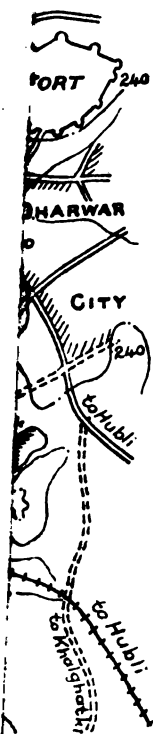
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VAR,

2000 Yards



16-o :—Message taken by Captain Banks from General Officer commanding to Officer Commanding Cavalry—

“ With three Squadrons in Ramapoor valley cut railway to-night this evening, and to-morrow morning manœuvre towards Dharwar. Captain Banks will explain my plan of operations.”

The camp on Nurrendra Road was perfect from a military point of view, but there was no water.

This failure of water was quite unexpected as the map showed water, and the inhabitants stated there was sufficient. We found afterwards that a dam kept back all the water. Corps, who had neglected opportunities to fill water-bottles, had to send back carts for water at Marmagutti, about 1½ miles. The Intelligence Department had sent back information in time for most corps to obtain water about Marmagutti.

For camp and outposts see sketch. Verbal instructions given on the ground.

A field hospital and defensive post prepared at Marmagutti.

The weather to-day was fine and a fresh breeze. The short march to-day enabled the troops to start late and have a fairly easy day so as to be ready for the battle to-morrow.

In the evening all officers were assembled on the right of the camp, from which there was a good view of Dharwar, and the General Officer Commanding fully explained how he proposed to march and attack Dharwar, and the apparent advantages and disadvantages of the proposed flank march.

The General Officer Commanding formed the troops in camp in order of battle so as to be prepared in case the enemy should come out of Dharwar and attack, which, however, was unlikely, as the ground would be unfavourable.

REGD. C. HART,

*Assistant Adjutant-General.*

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## DIVISIONAL ORDERS.

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BY BRIGADIER-GENERAL R. C. HART, V.C., C.B., COMMANDING  
BELGAUM DIVISION.

HEAD-QUARTERS,

DHARWAR AND NURRENDRA CROSS ROADS ;

*Issued 5 P.M., 10th March 1899.*

1. The whole Division will march at 6-15 to-morrow in echelon right (Gilchrist's Brigade) leading. Brigade Division, Royal Artillery, in rear of right. Staff Officers will guide Brigades. Distances and intervals will be indicated on the ground.

Both Brigades to have flank guards on Dharwar side. One Squadron of Cavalry to march on outer flank.

2. The remaining Divisional troops and Divisional Ammunition Column and Divisional Hospitals to march in rear of the Artillery under Lieutenant-Colonel Huggins, D.S.O.

3. The men to carry one day's cooked rations. Horses grain.
4. The whole of the baggage, except ammunition and field hospitals, will retire on Marmagutti; also the sick. Special instructions issued to Officer Commanding at Marmagutti; also to Lieutenant-Colonel Huggins, Ammunition Column, and the Principal Medical Officer.
5. Signalling communication to be kept up with Marmagutti, and when possible, with Kerrich's Cavalry who are to-night in Ramapoor valley with orders to move on Dharwar, approximately by line of railway.
6. Brigadier-General Hart will march with Gilchrist's Brigade at first.

By order,  
REGD. C. HART,  
*Assistant Adjutant-General.*

### BRIGADE ORDERS.

BY LIEUTENANT-COLONEL E. LAWFORD, COMMANDING 1ST BRIGADE, BELGAUM DIVISION.

OUTPOST LINE ;

5-30 P.M., 10th March 1899.

1. The 1st Brigade will march to-morrow morning at 6-15 A.M. in echelon on the left rear of Gilchrist's Brigade in the following order from the right :—26th Madras Infantry, 20th Madras Infantry, 2nd Welsh Regiment, 1st East Yorkshire Regiment, in line of quarter columns.

The East Yorkshire Regiment will furnish a flanking guard on left flank.

2. One day's rations (cooked) and grain to be carried.
3. The whole of the baggage, except the Reserve Ammunition and Field Hospitals, will retire on Marmagutti; also the sick. The Reserve Ammunition will follow the Brigade.
4. The General Officer Commanding Division, at first, will be with Gilchrist's Brigade. The General Officer Commanding 1st Brigade at head of the Brigade.

By order,  
E. LAWFORD, *Lieut.-Col.,*  
*Deputy Assistant Adjutant and Quarter-Master-General,*  
*1st Brigade.*

### REGIMENTAL ORDERS.

BY MAJOR G. S. KERRICH, COMMANDING 1ST MADRAS LANCERS.  
CAMP RAMAPOOR VALLEY;  
4 P.M., 10th March 1899.

1. The Regiment will march to seize the railway crossing north of Jojulkuttee, which is weakly held by the enemy, at 5 P.M. to-day.

2. The railway is to be partially destroyed by removing the fish-plates, which are to be hidden in the nullah close by.

3. The regiment will bivouac near the crossing to-night, and march at 3 A.M. to-morrow on Dharwar, the right half "B" Squadron forming the outposts for the night.

4. Two guides will be seized from the nearest village to-night to conduct the march to-morrow on Dharwar.

Need  
be in Re-  
mental  
Orders.

5. On approaching Dharwar signalling communication is to be established with the 2nd Brigade.

Why  
strict it to 2  
Brigade?  
R. C.

6. As soon as the Division forms up to attack Dharwar, the regiment will concentrate near the Artillery.

7. Regimental Orders Nos. 1, 2, 3, 6, 7, 9, 10, 11, 13 and 14 of the 7th instant hold good.

By order,

J. BRUCE, *Lieutenant,*  
*Adjutant, 1st Madras Lancers.*

## BRIGADE ORDERS.

BY COLONEL R. GILCHRIST, COMMANDING 2ND BRIGADE, BELGAUM DIVISION.

BRIGADE HEAD-QUARTERS,

CAMP 2 MILES S. OF MARMAGUTTI ;

5 P.M., 10th March 1899.

1. Enemy reported to be holding Dharwar.

2. The Officer Commanding Division determines to attack Dharwar.

3. The Division will march at 6-15 A.M. to-morrow in echelon (Gilchrist's Brigade leading)—Brigade Division, Royal Artillery, in rear of right.

Staff Officers will guide Brigades, and distances and intervals will be indicated on the ground.

Divisional troops to march in rear of Royal Artillery.

Men to carry one day's cooked rations and horses one day's grain.

The whole of the baggage, except Reserve Ammunition and Field Hospitals, will retire on Marmagutti ; also all the sick.

Both Brigades to have Flank Guards on left flank.

One Squadron of Cavalry will cover right flank.

General Officer Commanding Division will march with Gilchrist's Brigade at first.



## 4. The Brigade will march at 6-15 A.M. to-morrow —

Advanced Guard ...	...	Three Companies, 2nd Derbyshire Regiment.
		{ 2nd Derbyshire Regiment.
		{ 1st Royal Warwickshire Regiment.
Main-body ...	...	{ 9th Regiment, Madras Infantry.
		{ 15th Regiment, Madras Infantry, and machine guns.

Verbal orders will be given on the ground as regards formations and distances; and the flank guard to the Brigade.

5. The Officer Commanding Brigade will march at the head of the main-body.

By order,

R. GILCHRIST, *Colonel*,

*Deputy Assistant Adjutant-General, 2nd Brigade.*

### REGIMENTAL ORDERS.

By MAJOR H. E. IRWIN, COMMANDING 1ST ROYAL WARWICKSHIRE REGIMENT.

CAMP 2 MILES S. OF MARMAGUTTI;

6 P.M., 10th March 1899.

1. Enemy reported to be holding Dharwar.
2. Officer Commanding Division determines to attack Dharwar.
3. The battalion will parade at 6-5 A.M. to-morrow and join line of march in rear of Derbyshire Regiment at 6-20 A.M.
4. One day's cooked rations to be issued on parade and carried in haversacks.
5. 150 rounds of ammunition per man will be carried. Arrangements same as yesterday.
6. The whole of the baggage, except Reserve Ammunition and Field Hospitals, will remain in camp till orders are received from the Divisional Transport Officer, when they will march under his orders to Marmagutti.
7. 1st Reserve Ammunition will follow in rear of the battalion under the Quarter-Master.

By order,

H. E. IRWIN, *Major*,

*for Adjutant, 1st Royal Warwickshire Regiment.*

### REGIMENTAL ORDERS.

By MAJOR J. JACKSON, COMMANDING 9TH MADRAS INFANTRY.

CAMP 2 MILES S. OF MARMAGUTTI;

5-30 P.M., 10th March 1899.

1. Enemy reported to be holding Dharwar.

2. The Officer Commanding Division determines to attack to-morrow.
3. The Regiment will fall in at 6 A.M. to-morrow.
4. One day's cooked rations will be carried by the men.
5. The baggage will retire and be parked at Marmagutti; also the sick.
6. Reserve Ammunition will accompany the regiment.

By order,

J. JACKSON, *Major,*

*for Adjutant, 9th Madras Infantry.*

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### PRINCIPAL MEDICAL OFFICER'S DIARY.

---

*11th March 1899.*

- (a) Attack on Dharwar successful.
- (b) Established Field Hospitals in Collector's bungalow and offices, Dharwar (with General Officer Commanding's sanction).
- (c) Forwarded daily state of sick to Principal Medical Officer, India, and to General Officer Commanding.
- (d) Forwarded nominal roll of wounded to Principal Medical Officer, India, and to General Officer Commanding.
- (e) Field Service weekly return of sick, British and Native, forwarded to Principal Medical Officer, India.
- (f) Field Service weekly sanitary report forwarded to Principal Medical Officer, India, and to General Officer Commanding.
- (g) Wounded at Marmagutti reported to be doing well.

R. W. KNOX, *Lieutenant, I.M.S.,*

*Principal Medical Officer.*

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### STAFF DIARY.

---

HEAD-QUARTERS, DHARWAR;

*11th March 1899.*

So far there had been no mist in the mornings. It was therefore a great surprise to find Dharwar and the intervening valley shrouded in a dense mist. Fortunately the compass bearing was taken of the prominent peak on which Gilchrist's Brigade was to march. This mist was a most unexpected stroke of good fortune and saved many casualties. The enemy had no indication that the General Officer Commanding had decided to march right round Dharwar, and as the fog screened his movements, the enemy was completely taken by surprise. As he would have no time to conform to our movements, it was thought unnecessary to weaken the small force by detaching any troops to make a feint up the main road.

As the country was unknown, the General Officer Commanding had to change his dispositions from time to time. Both Brigades marched in order of battle ready to front to their left. At first Gilchrist's Brigade led with Lawford in echelon to the inner flank. The fog enabled the General to make a rather closer march than originally intended. Gilchrist's Brigade was therefore led down to the stream, which, by reason of steep banks and bushes, is quite an obstacle, the Brigade was to keep the line of the stream. Lawford's Brigade moved on, now on the outer flank. The Artillery and Field Hospitals by the Kelgeri Road, with the Sappers, 21st Pioneers, and a squadron on their outer flank.

Both Infantry Brigades halted and reformed in the mango groves east of the Kelgeri Lake. Lawford echeloned to the left rear of Gilchrist, both Brigades now facing due east. The Divisional troops continued to move by the road due south and ultimately took up position on hills south of railway as shown on map. The mist was beginning to clear a little, but the ground and trees completely hid the whole division.

The Infantry Brigades continued their flank march, halting and fronting under cover of the ground and trees as shown on map. A few shots only were fired by the flank guards. The mist cleared at 8-15 and our Artillery opened on the large high railway offices from which marksmen were firing. The Batteries were ordered to fire heavily on the ground east of Lawford's Brigade, but soon the enemy's guns opened at distant ranges on our Batteries from a hill to east of their position. One of our Batteries became engaged with the enemy's guns.

In order not to give the enemy time for countermoves, Lawford was ordered to attack at once the hill to his east, and Gilchrist was ordered to follow in echelon to Lawford's right, protecting Lawford's right flank and gradually working up the valley.

*N.B.—It would have prolonged the Staff Ride considerably, and introduced great complications, to suppose the attack unsuccessful, therefore it was assumed that the enemy was defeated.*

The Artillery and Infantry fire obliged the enemy's guns to abandon their position when our guns moved up to the high ground and fired on the cantonment.

After the defeat of the enemy, head-quarters were established at the Commissioner's house.

It was a very busy time; there were hundreds of prisoners and much confusion. Orders had to be issued for keeping order in Dharwar, for refitting and pursuit towards Londa, and for organizing everything. The Sappers, 21st Pioneers, and the two Batteries with the Cavalry, under Lieutenant-Colonel Huggins, were ordered to march at once on Londa. It was not until 2 P.M. that any more troops could march on Londa. One regiment from each Brigade had to be kept back. Great efforts were made to get some trains ready and provisioned. One train was ready at 16-30. The Marmagutti convoy, with all the baggage, arrived at noon. Ample Commissariat and other stores were captured at Dharwar.

At 16-0 o'clock news from Belgaum that the enemy had fallen back from Goonjee on Londa, but they were too strong to be attacked, therefore the Officer Commanding was marching to the west on Tinai Ghat.

The line of our attack was most favourable to our Infantry, and secured the co-operation of our guns, therefore our losses were small. The enemy acknowledged to have been taken by surprise, and had made all his arrangements to meet an attack from the north-west. The enemy's losses were not great, because he was thrown into such confusion by the unexpected direction of our attack, and the positions we gained so dominated Dharwar, that no great resistance was made; and after a short bombardment, seeing no escape round our flanks, the enemy laid down their arms.

It was 16-30 before the General Officer Commanding could leave Dharwar by train, and catch up Lieutenant-Colonel Huggins' troops that had followed the enemy 7 miles to Moogud, and had repaired the slight damage done to the railway. Lieutenant-Colonel Huggins had halted, because the Artillery could no longer keep close to the railway, and the country in advance was very woody and hilly, and he was in touch with a strong rear guard that the enemy had organised.

REGD. C. HART,

*Assistant Adjutant-General.*

### GENERAL REMARKS.

Thirty officers, representing all ranks, took part in the Staff Ride, all were volunteers; consequently no one's interest in the operations flagged at any time. The number was not at all too large. We made three marches, and on the fourth day attacked a position. I think four working days sufficient, and might be reduced to three, but I should prefer four. We tried to combine pleasure with duty, but our time was too fully occupied, and it was necessary from time to time to hold conferences in order to explain the military situations, but on another occasion I should start earlier in the season, and allow an off day or two for sport.

I venture to suggest that an annual Staff Ride at every large station would be found interesting and instructive, and the cost would be *nil*, where transport is available, provided it is not considered necessary to print the report, which, with the maps, becomes expensive. Perhaps it might be considered desirable to print one report in each Command.

REGD. C. HART, *Brigadier-General,*

*Commanding Belgaum District.*

### REMARKS BY THE LIEUTENANT-GENERAL COMMANDING THE FORCES, MADRAS.

A good report on an interesting Staff Ride.

There is a tendency shown in it to go into rudimentary details which should be known to all trained soldiers,



TAOK

VAR,



Dr. Capt.  
N. York R

16-o :—Message taken by Captain Banks from General Officer Commanding to Officer Commanding Cavalry—

“With three Squadrons in Ramapoor valley cut railway to-night or this evening, and to-morrow morning manœuvre towards Dharwar. Captain Banks will explain my plan of operations.”

The camp on Nurrendra Road was perfect from a military point of view, but there was no water.

This failure of water was quite unexpected as the map showed water, and the inhabitants stated there was sufficient. We found afterwards that a dam kept back all the water. Corps, who had neglected opportunities to fill water-bottles, had to send back carts for water at Marmagutti, about  $1\frac{1}{2}$  miles. The Intelligence Department had sent back information in time for most corps to obtain water about Marmagutti.

For camp and outposts see sketch. Verbal instructions given on the ground.

A field hospital and defensive post prepared at Marmagutti.

The weather to-day was fine and a fresh breeze. The short march to-day enabled the troops to start late and have a fairly easy day so as to be ready for the battle to-morrow.

In the evening all officers were assembled on the right of the camp, from which there was a good view of Dharwar, and the General Officer Commanding fully explained how he proposed to march and attack Dharwar, and the apparent advantages and disadvantages of the proposed flank march.

The General Officer Commanding formed the troops in camp in order of battle so as to be prepared in case the enemy should come out of Dharwar and attack, which, however, was unlikely, as the ground would be unfavourable.

REGD. C. HART,

*Assistant Adjutant-General.*

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## DIVISIONAL ORDERS.

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BY BRIGADIER-GENERAL R. C. HART, V.C., C.B., COMMANDING  
BELGAUM DIVISION.

HEAD-QUARTERS,

DHARWAR AND NURRENDRA CROSS ROADS ;

*Issued 5 P.M., 10th March 1899.*

1. The whole Division will march at 6-15 to-morrow in echelon right (Gilchrist's Brigade) leading. Brigade Division, Royal Artillery, in rear of right. Staff Officers will guide Brigades. Distances and intervals will be indicated on the ground.

Both Brigades to have flank guards on Dharwar side. One Squadron of Cavalry to march on outer flank.

2. The remaining Divisional troops and Divisional Ammunition Column and Divisional Hospitals to march in rear of the Artillery under Lieutenant-Colonel Huggins, D.S.O.

3. The men to carry one day's cooked rations. Horses grain.
4. The whole of the baggage, except ammunition and field hospitals, will retire on Marmagutti; also the sick. Special instructions issued to Officer Commanding at Marmagutti; also to Lieutenant-Colonel Huggins, Ammunition Column, and the Principal Medical Officer.
5. Signalling communication to be kept up with Marmagutti and when possible, with Kerrich's Cavalry who are to-night in Kamapoor valley with orders to move on Dharwar, approximately by 1200 railway.
6. Brigadier-General Hart will march with Gilchrist's Brigade at first.

By order,

REGD. C. HART,

*Assistant Adjutant-General*

### **BRIGADE ORDERS.**

BY LIEUTENANT-COLONEL F. LAWFORD, COMMANDING 1ST BRIGADE, BELGAUM DIVISION.

OUTPOST LINE :

5.30 P.M., 10th March 1900.

1. The 1st Brigade will march to-morrow morning at 6.15 A.M. in echelon on the left rear of Gilchrist's Brigade in the following order from the right:—26th Madras Infantry, 20th Madras Infantry, 2nd Welsh Regiment, 1st East Yorkshire Regiment, in line of quarter columns.

The East Yorkshire Regiment will furnish a flanking guard on left flank.

2. One day's rations (cooked) and grain to be carried.

3. The whole of the baggage, except the Reserve Ammunition and Field Hospitals, will retire on Marmagutti; also the sick.

The Reserve Ammunition will follow the Brigade.

4. The General Officer Commanding Division, at first, will be with Gilchrist's Brigade. The General Officer Commanding 1st Brigade at head of the Brigade.

By order,

E. LAWFORD, *Lieut.-Col.*

*Deputy Assistant Adjutant and Quarter-Master-General*

*1st Brigade*

### **REGIMENTAL ORDERS.**

BY MAJOR G. S. KERRICH, COMMANDING 1ST MADRAS LANCERS  
CAMP KAMAPOOR VALLEY,

4 P.M., 10th March 1900.

1. The Regiment will march to seize the railway crossing north of Jajalkuttee, which is weakly held by the enemy, at 5 P.M. to-day.

2. The railway is to be partially destroyed by removing the fish-plates, which are to be hidden in the nullah close by.

3. The regiment will bivouac near the crossing to-night, and march at 3 A.M. to-morrow on Dharwar, the right half "B" Squadron forming the outposts for the night.

4. Two guides will be seized from the nearest village to-night to conduct the march to-morrow on Dharwar.

Need not be in Regimental Orders.

5. On approaching Dharwar signalling communication is to be established with the 2nd Brigade.

Why restrict it to 2nd Brigade? R. C. H.

6. As soon as the Division forms up to attack Dharwar, the regiment will concentrate near the Artillery.

7. Regimental Orders Nos. 1, 2, 3, 6, 7, 9, 10, 11, 13 and 14 of the 7th instant hold good.

By order,

J. BRUCE, *Lieutenant,*  
*Adjutant, 1st Madras Lancers.*

### BRIGADE ORDERS.

BY COLONEL R. GILCHRIST, COMMANDING 2ND BRIGADE, BELGAUM DIVISION.

BRIGADE HEAD-QUARTERS,

CAMP 2 MILES S. OF MARMAGUTTI ;

5 P.M., 10th March 1899.

1. Enemy reported to be holding Dharwar.

2. The Officer Commanding Division determines to attack Dharwar.

3. The Division will march at 6-15 A.M. to-morrow in echelon (Gilchrist's Brigade leading)—Brigade Division, Royal Artillery, in rear of right.

Staff Officers will guide Brigades, and distances and intervals will be indicated on the ground.

Divisional troops to march in rear of Royal Artillery.

Men to carry one day's cooked rations and horses one day's grain.

The whole of the baggage, except Reserve Ammunition and Field Hospitals, will retire on Marmagutti ; also all the sick.

Both Brigades to have Flank Guards on left flank.

One Squadron of Cavalry will cover right flank.

General Officer Commanding Division will march with Gilchrist's Brigade at first.



## 4. The Brigade will march at 6-15 A.M. to-morrow —

Advanced Guard ...	...	Three Companies, and Derbyshire Regiment.
		{ 2nd Derbyshire Regiment.
Main-body ...	...	{ 1st Royal Warwickshire Regiment.
		{ 9th Regiment, Madras Infantry.
		{ 15th Regiment, Madras Infantry, and machine guns.

Verbal orders will be given on the ground as regards formations and distances; and the flank guard to the Brigade.

5. The Officer Commanding Brigade will march at the head of the main-body.

By order,

R. GILCHRIST, Colonel

*Deputy Assistant Adjutant-General, 2nd Brigade*

### REGIMENTAL ORDERS.

BY MAJOR H. E. IRWIN, COMMANDING 1ST ROYAL WARWICKSHIRE REGIMENT.

CAMP 2 MILES S. OF MARMAGUTTI.

6 P.M., 10th March 1897.

1. Enemy reported to be holding Dharwar.
2. Officer Commanding Division determines to attack Dharwar.
3. The battalion will parade at 6-5 A.M. to-morrow and will march in rear of Derbyshire Regiment at 6-20 A.M.
4. One day's cooked rations to be issued on parade and carried in haversacks.
5. 150 rounds of ammunition per man will be carried. Arrangements same as yesterday.
6. The whole of the baggage, except Reserve Ammunition and Field Hospitals, will remain in camp till orders are received from the Divisional Transport Officer, when they will march under his orders to Marmagutti.
7. 1st Reserve Ammunition will follow in rear of the Battalion under the Quarter-Master.

By order,

H. E. IRWIN, Major

*for Adjutant, 1st Royal Warwickshire Regiment*

### REGIMENTAL ORDERS.

BY MAJOR J. JACKSON, COMMANDING 9TH MADRAS INFANTRY.

CAMP 2 MILES S. OF MARMAGUTTI.

5-30 P.M., 10th March 1897.

1. Enemy reported to be holding Dharwar.

2. The Officer Commanding Division determines to attack to-morrow.
3. The Regiment will fall in at 6 A.M. to-morrow.
4. One day's cooked rations will be carried by the men.
5. The baggage will retire and be parked at Marmagutti; also the sick.
6. Reserve Ammunition will accompany the regiment.

By order,

J. JACKSON, *Major,*

*for Adjutant, 9th Madras Infantry.*

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### PRINCIPAL MEDICAL OFFICER'S DIARY.

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*11th March 1899.*

- (a) Attack on Dharwar successful.
- (b) Established Field Hospitals in Collector's bungalow and offices, Dharwar (with General Officer Commanding's sanction).
- (c) Forwarded daily state of sick to Principal Medical Officer, India, and to General Officer Commanding.
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- (g) Wounded at Marmagutti reported to be doing well.

R. W. KNOX, *Lieutenant, I.M.S.,*

*Principal Medical Officer.*

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### STAFF DIARY.

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*11th March 1899.*

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As the country was unknown, the General Officer Commanding had to change his dispositions from time to time. Both Brigades marched in order of battle ready to front to their left. At 8-15 Gilchrist's Brigade led with Lawford in echelon to the inner flank. The fog enabled the General to make a rather closer march than originally intended. Gilchrist's Brigade was therefore led down to the stream, which, by reason of steep banks and bushes, is quite an obstacle, the Brigade was to keep the line of the stream. Lawford's Brigade moved on, now on the outer flank. The Artillery and Field Hospitals by the Kelgeri Road, with the Sappers, 21st Pioneers, and a squadron on their outer flank.

Both Infantry Brigades halted and reformed in the mango grove east of the Kelgeri Lake. Lawford echeloned to the left, and Gilchrist, both Brigades now facing due east. The Divisional troops continued to move by the road due south and ultimately to a position on hills south of railway as shown on map. The mist was beginning to clear a little, but the ground and trees completely hid the whole division.

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In order not to give the enemy time for counter-moves, Lawford was ordered to attack at once the hill to his east, and Gilchrist was ordered to follow in echelon to Lawford's right, protecting Lawford's right flank and gradually working up the valley.

N.B.—*It would have prolonged the Staff Ride considerably, and introduced great complications, to suppose the attack unsuccessful, therefore it was assumed that the enemy was defeated.*

The Artillery and Infantry fire obliged the enemy's guns to abandon their position when our guns moved up to the high ground and fired on the cantonment.

After the defeat of the enemy, head-quarters were established at the Commissioner's house.

It was a very busy time; there were hundreds of prisoners and much confusion. Orders had to be issued for keeping order at Dharwar, for refitting and pursuit towards Lonla, and for organizing everything. The Sappers, 21st Pioneers, and the two Batteries, with the Cavalry, under Lieutenant-Colonel Huggins, were ordered to march at once on Lonla. It was not until 2 P.M. that any more troops could march on Lonla. One regiment from each Brigade had to be kept back. Great efforts were made to get some transport and provisioned. One train was ready at 10-30. The Main baggage conveyance, with all the baggage, arrived at noon. Ample Commissariat and other stores were captured at Dharwar.

At 16-0 o'clock news from Belgaum that the enemy had fallen back from Goonjee on Londa, but they were too strong to be attacked, therefore the Officer Commanding was marching to the west on Tinai Ghat.

The line of our attack was most favourable to our Infantry, and secured the co-operation of our guns, therefore our losses were small. The enemy acknowledged to have been taken by surprise, and had made all his arrangements to meet an attack from the north-west. The enemy's losses were not great, because he was thrown into such confusion by the unexpected direction of our attack, and the positions we gained so dominated Dharwar, that no great resistance was made; and after a short bombardment, seeing no escape round our flanks, the enemy laid down their arms.

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REGD. C. HART,

*Assistant Adjutant-General.*

### GENERAL REMARKS.

Thirty officers, representing all ranks, took part in the Staff Ride, all were volunteers; consequently no one's interest in the operations flagged at any time. The number was not at all too large. We made three marches, and on the fourth day attacked a position. I think four working days sufficient, and might be reduced to three, but I should prefer four. We tried to combine pleasure with duty, but our time was too fully occupied, and it was necessary from time to time to hold conferences in order to explain the military situations, but on another occasion I should start earlier in the season, and allow an off day or two for sport.

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REGD. C. HART, *Brigadier-General,*

*Commanding Belgaum District.*

### REMARKS BY THE LIEUTENANT-GENERAL COMMANDING THE FORCES, MADRAS.

A good report on an interesting Staff Ride.

There is a tendency shown in it to go into rudimentary details which should be known to all trained soldiers,

It does not seem to me advisable that the Divisional Commander should be his own Assistant Adjutant-General unless it is unavoidable. The same remark applies to Staff of Brigades, although it is sometimes done.

The maps are very clear and good in every detail.

(Sd.) G. B. WOLSELEY, *Lieutenant-General,*  
20th July 1899. *Commanding the Forces, Madras.*

## SOME FURTHER REMARKS ON THE INDIAN VOLUNTEER FORCE.

BY CAPTAIN E. DAWSON, UPPER BURMA VOLUNTEER RIFLES.

Those who read my article\* in the issue of the "Journal" for July last will remember that my proposition (1)—"That the efficiency and therefore the value of the Indian Volunteer Force at the present time does not amount to a fair return for the expenditure of Government upon it; in other words, that Government is not getting its money's worth"—was in the main taken as granted. It was assumed that few persons would disagree, and the article being primarily intended for a limited public interested in kindred matters, details were not dwelt upon. Reflection, however, has convinced me that it is necessary, before putting forward (as I intend to do later) a definite and detailed scheme for the creation of a new Auxiliary Force superseding the Volunteer Force, to illustrate the truth of proposition (1), by showing what the expenditure of Government upon the Volunteer Force is, and how it is applied.

If I am able to show in my next article that the same amount is enough to provide a more efficient force under a different organisation, an important part of my object will have been gained. It will be much, indeed, if I succeed in awakening a more practical interest in the subject among members of this Institution.

So far as the general public is concerned, there is a disposition to tolerate the Volunteers, *because they cost nothing*. It would be, at least, ungracious to say that the toleration is wrong, but the reason undoubtedly is.

I am able to furnish the following figures from the Military Budget Estimate, 1899-1900 :—

Grant 15—Volunteer Corps : Amount of Estimate, Rs. 20,25,640.

I think it will come as a surprise to most readers that the expenditure of the Government of India for a year upon its Volunteer Force is, in round numbers, twenty and a quarter lakhs.

*This sum is sufficient to pay the annual cost of four battalions of British or ten battalions of Native Infantry and to leave in either case enough over for a couple of batteries of Mountain Artillery.*

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\* Some remarks on the present state of the Indian Volunteer Force, and a proposal for its reorganisation as Militia.

# STATE OF TEXAS DEPARTMENT OF COMMERCE BUREAU OF INSURANCE

REPORT OF THE COMMISSIONER OF INSURANCE  
 FOR THE YEAR 1900

Rs.  
 1,000,000  
 9,125,000  
 10,125,000

Is  
 5,000  
 60,000  
 20,000  
 15,000  
 100,000  
 1,000,000  
 10,000,000

THE STATE OF TEXAS  
 DEPARTMENT OF COMMERCE  
 BUREAU OF INSURANCE  
 REPORT OF THE COMMISSIONER OF INSURANCE  
 FOR THE YEAR 1900

THE STATE OF TEXAS  
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THE STATE OF TEXAS  
 DEPARTMENT OF COMMERCE  
 BUREAU OF INSURANCE  
 REPORT OF THE COMMISSIONER OF INSURANCE  
 FOR THE YEAR 1900

*Taking these two major heads—Establishment and Capitation Grant—only, and reckoning the rupee at Rs. 15 = £ 1, the cost per head of the Indian Volunteers works out at £ 4-8-3 per annum.*

*The cost per head of the Volunteers of Great Britain (263,963 men), as shown in Army Estimates, 1898-99, was £ 2-6-6 per annum.*

This difference becomes still more striking when the following facts are borne in mind :—

The Volunteers in Great Britain have higher standards of efficiency than do those in India. They are armed with the Lee-Metford rifle. Their equipment is fairly complete : it is such, at any rate, as could be completed, in England, within a few days. Their uniforms are smart and serviceable, and are necessarily more expensive than those of Indian Volunteers.

The weapon of the Indian Volunteer Force is the Martini-Henry rifle. Most of these arms are of old issue and much worn. Owing to their violence of recoil, more time is required for the instruction of recruits with these weapons than with modern rifles, and many are hindered from becoming good shots by the same cause. Any one who has been on a range has seen how youths and men of slight physique “funk” and flinch from their rifles after a few shots. This may seem a small matter, but, in my opinion, it is worth attention.

As for equipment, in the five corps in which I have served in India, I have not seen a great-coat, haversack, mess-tin, or even a water-bottle. It is probable that the supply departments of the army would be able to furnish these articles in the event of the Volunteers taking the field, but the distribution and issue would necessarily occupy time which, in such an emergency, would be very valuable. At present no unit is capable of a day's march from its head-quarters. I speak of Infantry.

As for clothing, the uniforms need not and cannot be made ornamental, but they should be serviceable and comfortable. The pattern of helmet in use affords very little protection from the sun, and many corps have no putties, without which khaki is neither comfortable nor neat.

The expenditure upon establishment is needlessly swollen by the existing distribution of corps. I have repeatedly seen instances of the Volunteers—perhaps 15 or 20 men in all,—of a small up-country station, being divided between two, or even three, different corps, each of which sends instructors to the place for drill and musketry. This absurdity was well pointed out by Captain Iggulden in his article on “Indian Volunteers” in the “Journal” for July 1897. He did not, however, dwell on the financial aspect of the matter. To put it clearly, the large number of instructors thus employed increases, instead of diminishing, the proportionate expenditure on travelling, which amounts, as I have shown above, to more than a lakh-and-a-quarter.

The number of Adjutants does not appear to be excessive, and their rate of pay from the Volunteer estimates certainly is not. The Adjutant, if he is zealous enough not to be altogether discouraged by the ignorance of, and indifference to, their duties, often manifested by the other officers, is apt to dry-nurse the corps, and if his zeal be *not*



The two main heads of expenditure are—

				Rs.
Establishment	...	...	...	10,14,900
Capitation grant	...	..	...	9,12,570
		Total	...	<u>19,27,470</u>

The remaining Rs. 98,170 is thus distributed—

Grants-in-aid of—

				Rs.
Constructing Rifle Ranges	...	...	...	5,000
Camps of Exercise	...	...	...	60,000
Allowances for field days	...	...	...	20,000
Reserves	...	...	...	13,170
		Total	...	<u>98,170</u>
				<u>19,27,470</u>
		GRAND TOTAL	...	<u>20,25,640</u>

(I) To take establishment first—

In the whole of India there are only two paid Commandants. One, in Madras, draws Rs. 13,830 per annum, and the other, in Bombay, Rs. 1,800.

I presume that the latter is not intended seriously as remuneration for the services of the officer. There is one Naval Instructor, in Calcutta, on Rs. 3,600.

There are—

				Rs.
45 Adjutants, whose pay, with extra allowances, aggregates	...	...	...	3,65,820
258 Sergeant Instructors	...	...	...	3,89,250
2 Seaman Instructors	...	...	...	3,840
71 Drill Instructors	...	...	...	4,640
2 Gunnery Instructors	...	...	...	60
1 Armourer Sergeant	...	...	...	1,550
230 Khalassis and Lascars	...	...	...	22,360
		Total	...	<u>7,87,520</u>

The remaining 2½ lakhs of the head "Establishment" is made up by exchange compensation allowance, travelling and out-station allowances (Rs. 1,02,700), family allowances, and contingent expenses. Also Rs. 21,060 which is set down as probable savings.

Total establishment, Rs. 10,14,900.

(II) Capitation grant—

The estimated total number of efficient for 1899-1900 is 29,131 men.

The expenditure under this head is distributed as follows:—

				Rs.
Ordinary capitation grant	...	...	...	6,08,490
Special and extra grants	...	...	...	3,00,310
Allowance for prizes	...	...	...	23,640
" " bands	...	...	...	39,600
		Total	...	<u>9,72,040</u>
		Deduct probable savings	...	<u>59,470</u>
				<u>9,12,570</u>

*Taking these two major heads—Establishment and Capitation Grant—only, and reckoning the rupee at Rs. 15 = £ 1, the cost per head of the Indian Volunteers works out at £ 4-8-3 per annum.*

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This difference becomes still more striking when the following facts are borne in mind :—

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equal to this strain, finding that neither the public nor the members of the corps themselves care, he not unnaturally takes things easily. The credit of most of such work, as is done, belongs to the Adjutants, and I think that probably the portion of the grant expended upon them is the best spent of any.

The question as to what proportion of value is obtained in return for the expenditure under the other major head "Capitation Grant" is a delicate one. Obviously, the answer must largely depend upon what proportion is (nominally) earned. Low as the standards are, there is too much reason to believe that a considerable proportion of the men returned as "efficient" are not even nominally so. More than this, I have heard of cases in which extra capitation grants have been drawn for "extra-efficients," who had not really qualified even as "efficients." It is not probable that the whole truth of this matter will ever be known; it is one of the lamentable defects inherent in the present system. It would be particularly interesting, if it were possible, to know how much of the three lakhs allotted for "Special and Extra Grants" is really "earned."

It is somewhat surprising to find only Rs. 23,000, or Rs. 16,000 less than the allowance for Bands, is allotted for prizes. The public has an idea that, if the Volunteers are good at anything, it is shooting. This is, unfortunately, an error. Good shots among them there certainly are, and, though these are often not "good Volunteers" otherwise, by all means let them be encouraged. But the average Volunteer is as careless and slovenly about his shooting as about his other work, and, as a natural consequence, he is a much worse shot than the average British soldier. With the latter, perhaps too much attention may sometimes be paid to making him get well down on his heel, etc., because the Red Book says so; but anyhow he has got to obey orders and give his whole attention to the matter in hand, whereas the volunteer if he feels "slack" can go home whenever he likes, and if he fancies the Range is too hot, or if the lemonade is not his particular brand, you may have your work cut out to get him on the ground again. If, therefore, it is desired that the Volunteers, as a body, should shoot decently, the only thing to be done is to offer plenty of prizes.

The Rs. 23,640 for prizes works out to about 13 annas per man for the whole force. The provision for prizes for skill-at-arms for British Regular Infantry for the whole of India is Rs. 90,829, which works out at about Rs. 1-8-0 per man. In the Punjab it is very nearly Rs. 2 per man.

The Rifle Associations of course offer inducements to a good Volunteer shot to make himself better, but they cannot reach down to the average man. This matter of offering prizes for shooting would seem to be one upon which Government might, with advantage, increase expenditure. It is a fine thing, no doubt, to have plenty of Bands, but the turning out of a few thousand tolerably good shots would, I think, give a better return for the money.

Under the head "Miscellaneous" the largest item is for camps of exercise—Rs. 60,000 for the four commands. This money would probably be much more economically spent if, instead of having the camps

corps by corps, the Volunteers could be brigaded together, or what would obviously be far better, with Regular Infantry. The latter is out of the question as regards the force generally, because there is no provision for camps of exercise for regulars excepting in the Punjab Command, where the allotment for this purpose is raised from Rs. 80,000 last year to Rs. 2,20,000 this year. Each Volunteer Corps having its own separate camp of exercise means that the value in increased efficiency obtained for the money depends almost entirely upon the actual energy, keenness, and knowledge possessed by the corps officers. Not many years ago I spent a few days under canvas with the corps in which I was then serving as a private. The first thing that struck me was the fact that the officers had a separate camp to themselves a quarter of a mile from the other. There were no guards or sentries, and scarcely a pretence at discipline. The bulk of the men stoutly refused to do any of the camp work such as tidying up, pitching tents, etc., and, in short, the whole thing was a striking example of how *not* to do it. There may be camps of exercise in which the golden opportunity of having the men together is turned to useful purpose.—I write of what I have seen, and it is evident that to spend money upon such a camp as that is sheer waste. It is probably safe to say that, unless camps can be under the supervision of some responsible and authoritative officer, it would be better not to have them at all, and to let the money be devoted to some other purpose—say, shooting prizes. My impression, derived from that solitary experience, is that the return for this particular expenditure is practically *nil*.

The grant for Rifle Range construction is only Rs. 5,000 for the four commands. If the small bore rifle is issued to Volunteers, this will have to be largely increased, or else arrangements will have to be made for the use everywhere of the Regulars' Ranges.

Reserves, Rs. 13,170. Fortunately, this amount is not a large one. My experience (which, I may again observe, has been limited to one province, though not to one corps) leads me to the conclusion that the return for this expenditure is infinitesimal. I have known scores of instances of reservists who have never served in the "Active" corps to which they are supposed to be attached. This, I know, is recognised, and provided for in the Regulations, but surely it is an absurdity. The very slight difference between the standards for efficiency does not justify the existence of such so-called reservists. In practice, these men are not made to qualify at all in many cases. Their existence on paper may serve to keep up the numbers of their corps to the minimum strength which entitles it to Band allowance and the services of a paid Adjutant, but it would be better to lower this minimum than to go on throwing money away on the "Reserves." As Captain Iggulden says,—“They receive no practical training of any use, would never be forthcoming if required, and should either be reorganised or disbanded at the earliest opportunity.”

I do not find anywhere in the estimates any provision for the grants of Rs. 100 in aid of outfit which, by a recent order, may be obtained by officers commissioned after a certain recent date which I

forget. I presume that grant 15 in the estimates does include provision for this expenditure somewhere, but it is not specifically mentioned. (It must not be forgotten that the cost of the Volunteer Force in Great Britain includes the outfit allowance to subalterns of £ 10 on appointment and £ 10 more after undergoing a prescribed course of instruction and obtaining the proficiency certificate.)\*

It cannot be said that the Indian outfit allowance is extravagant.

No stronger indication of the sad but, under the circumstances, hardly surprising fact that the Volunteer Force in its present state does not command public confidence and respect is needed than the gradual reduction of the percentage of Europeans in the ranks. In all our ports and large stations there are numbers of men employed in Civil Departments or engaged in commercial business, who are able to devote hours of every day to athletics and games and who are not and will not become Volunteers. I have not observed that the not inconsiderable war, in which the Empire is at this moment engaged, with all the interest and patriotic feeling aroused by the accounts reaching this country, has had any appreciable effect on Volunteer recruiting. I refuse to believe that the manly spirit which gives Great Britain her Volunteer Army, and which of yore made her bowmen, trained on village greens, famous over Europe, is dead in those of her sons who live and work in India. Their unwillingness to serve in the ranks of the Volunteer Force is due, not to indifference to the needs of the country or to their duty as citizens, but to a conviction that the Force as at present constituted is, to all intents and purposes, useless. They believe that the time, in this respect, is out of joint, and that they were not born to set it right. I allow that their conviction is but too well-founded. Their premise is sound, but their conclusion, I take leave to think, is mistaken. If one-half of the men who now hold aloof from this cause were to enrol themselves to-morrow, the Force would gain fifty per cent. in efficiency by the end of the current season. As, however, this would but bolster up a system which experience has shown to be unsuited to the conditions of life in this country, and perhaps prolong the existence of a Force which at its best cannot return full value for the money expended on it, I, for one, cannot greatly regret that this contingency is not in the least likely to happen.

"'Tis an ill bird—" the proverb is something musty. But I would not continue to hold my commission for another day if I did not hope to do something—however little—to bring about a better state of things.

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\* "Regulations for the Volunteer Force," 1896, paragraph 514-A.

## NEW METHODS OF MILITARY SIGNALLING.

BY LIEUTENANT J. D. G. WALKER, 1ST BATTALION ROYAL  
HIGHLANDERS.

### WIRELESS TELEGRAPHY.

A great deal has been written of Wireless Telegraphy for the Navy, but up to date it has hardly been regarded from a military point of view as a future means of communication in the field.

Wireless Telegraphy, although still in its infancy, has made such enormous strides towards improvement that we may reasonably assume it will become a most important factor in modern warfare.

It will first be necessary to try and put before you, as shortly as possible, a few points about Wireless Telegraphy and the probable uses it may be put to as a means of communication on service.

For military purposes the following instruments would be necessary:—

1. A telegraph sending key.

2. A battery of seven or more cells. Dry cells can be used and would be best for military purposes.

3. An induction coil.

4. A vertical wire, about 100 feet.

The distance signalled varies as the square of the height of the vertical wire.

5. A ground wire and plate.

6. Two small brass spheres.

7. A coherer: this consists of a small hermetically sealed glass tube, containing two small silver plates about the one-sixteenth of an inch apart. Between plates are fine silver and nickel filings.

The vertical wire is attached to one of these plates and the ground wire to the other.

8. A telegraph sounder.

9. Means for suspending the vertical wire: a balloon, a kite or telescopic aluminium poles.

10. Relay instrument.

11. A printing machine: this is not a necessity, but would save repetition of words and would be of great use when the current was weak, or in a great noise.

The transport for a single terminal station would be, one cart, or three mules, to carry all except the means of suspending the vertical wire, and for the latter the transport required will vary according to the means used.

In a country, with high trees or houses, the aluminium poles would be sufficient for medium distances, and one extra mule might be required, or the cart would carry everything, but in barren and houseless

countries a balloon for calm days and a kite for windy days both become necessary, and the transport will be largely increased.

Some explanation of the actual working of the system, for those who are not already acquainted with it, will be necessary.

On pressing down the telegraph sending key (1) the circuit is completed between the battery (2) and the primary wires of the induction coil (3) an electric current passes through the primary wire and returns to the battery. A secondary current passes through the secondary wire of the induction coil (3), one end of which is attached to the ground wire (5) and the other to one of the small brass spheres (6), keeping the key pressed down, a rapid succession of electric currents is induced in the secondary wire and passes through the small brass sphere connected with the coil to the other connected with the vertical wire (4).

These currents pass up the vertical wire and are finally forced out at the top by the succeeding currents; overflowing in all directions they take the form of Hertzian waves.

The receiving station, which must be in harmony with, that is, must have a similar vertical wire to the sending station, collects some of these waves, which pressing down the vertical wire as electric currents to the coherer (7) excites the filings and causes them to touch each other and the silver plates. Thus changing the coherer into a conductor and completing the circuit of the battery causing the telegraph sounder to act. So, by means of the sending key, long and short successions of Hertzian waves are made to pass between two stations, the circuit of the battery being connected and disconnected. The sounder thus indicates the dot and dashes. A relay can be used to increase the strength, if necessary, and a printing machine to record the signals. We now come to the likely uses of this means of communication for military purposes.

The chief of these would seem to be—

1. In countries where it is impossible to use ordinary telegraphy owing to the hostility of the inhabitants, or the topographical features of the ground.
2. To take up the work of the ordinary telegraph when a break occurs in a line.
3. To connect columns moving by different routes.
4. To connect moving columns and stationary posts, such as forts, etc.
5. In advance of an army to help to send in the reports, etc., from the divisional and independent cavalry.
6. Between the General Officer Commanding and the more important parts of an army attacking or defending a position.
7. Between detachments and the main-body.
8. Between ships and the shore.
9. For regimental telegraph work, *i.e.*, between the field telegraph head-quarters and regiments.
10. Between stations on different sides of a hill without moving up the hill.

Some visual signallers may fear their days are numbered, but they have no cause for alarm: on the contrary, the above mentioned duties, once taken up by another agent, will give them a much freer hand to use their talents with the most advanced part of an army, where wireless telegraphy can never hope to reach owing to the transport required.

The visual signaller, working hand in hand with the field telegraph, whether wireless or otherwise, will transmit to it the reports of the advanced cavalry whenever favourable occasions occur, and so save the wear and tear of horses and men by doing away with the necessity for mounted orderlies and also gain a great strategical advantage by an enormous saving of time in the transmission of these messages.

The advantages of wireless telegraphy appear to be as follows:—

It is much cheaper than the ordinary method. Its transport far less.

It offers fewer points of attack.

It can be used in all weathers, while visual signalling cannot. It can be used to signal from one side of a hill to the other.

It can be used to send a general message to two or more stations at once.

It can be used under favourable circumstances when in motion, *e.g.*, on a ship or train.

Whenever a telegraph office can be seized, wireless telegraphy can be at once applied, the extra instruments required being easily carried.

And, lastly, its simplicity.

We now come to the disadvantages:—

*The rate of sending is very slow.*

*Easily tapped and affected.*—Any similar station within an angle of 15 degrees from the sending station, and within the range of the instrument, can tap or affect the sending instrument. In this way the enemy can easily tap a message whilst friendly stations may interfere with one another quite unknowingly.

For military purposes the majority of stations would have to be in harmony, and this would be very easy for an enemy to discover.

And, lastly, the length of the vertical wire may necessitate very bulky means of suspension.

The principal alterations necessary may be summed up as follows:—

*A shorter vertical wire.*

*A more rapid rate of sending.*

Both of these will be achieved when a more sensitive coherer is invented.

Several people have professed to have done this, but the one described above (Marconi's) has so far proved to be the best.

*The difficulty of restraining the Hertzian waves from reaching stations they are not intended for will have to be overcome.*

No way of doing this has so far been invented, but it will probably be done either by absorbing those waves not required or by reflection.



There is every chance of these improvements being, to a great extent, effected, and, instead of wireless telegraphy being available as it now is for only a few isolated cases, it will prove of the greatest importance in modern warfare.

### ACETYLENE SIGNALLING LAMP.

Another agent that should prove invaluable to signalling is acetylene gas.

This is generated from calcium carbide.

Calcium carbide is a mineral substance, dark-grey in colour.

It is manufactured by fusing lime and either coke or charcoal (in the proportion of 100 lbs. lime to 68 lbs. coke or charcoal) at a temperature of about 300 degrees.

When comparatively pure, 1 lb. of carbide yields 5 cubic feet of gas.

One cubic foot of gas will give a candle-power of 50 for one hour.

Fifty lbs. of carbide measures about one cubic foot.

The gas is generated by the action of water on the carbide.

The oxygen of the water combines with the calcium and forms lime, whilst the hydrogen unites with the carbon and forms hydrocarbon gas (acetylene) consisting of 24 parts carbon and two parts hydrogen.

There are two different principles for generating this gas.

1. By adding the calcium as required to water and collecting the gas in a meter.
2. By adding water to the carbide.

The first is the best, as it ensures a constant pressure and a consequent regularity of light. But is less suited for a signalling lamp, as it is more liable to be damaged and is less portable.

In the second method the gas can be generated automatically as required (*vide* Plate I).

The generator required for a 75 candle-power light to burn for 10 hours occupies less than  $\frac{1}{8}$  cubic foot and varies in size directly as the candle-power.

The generator contains chambers for the carbide and a water tank.

The water is above the carbide chambers and connected to them by small tubes. On the gas top which leads from these chambers being opened, the pressure of water from above forces the air out of them and overflows on to the carbide and gas is formed.

The flow of water is controlled automatically by the amount of gas drawn off, and thus the amount of gas is regulated.

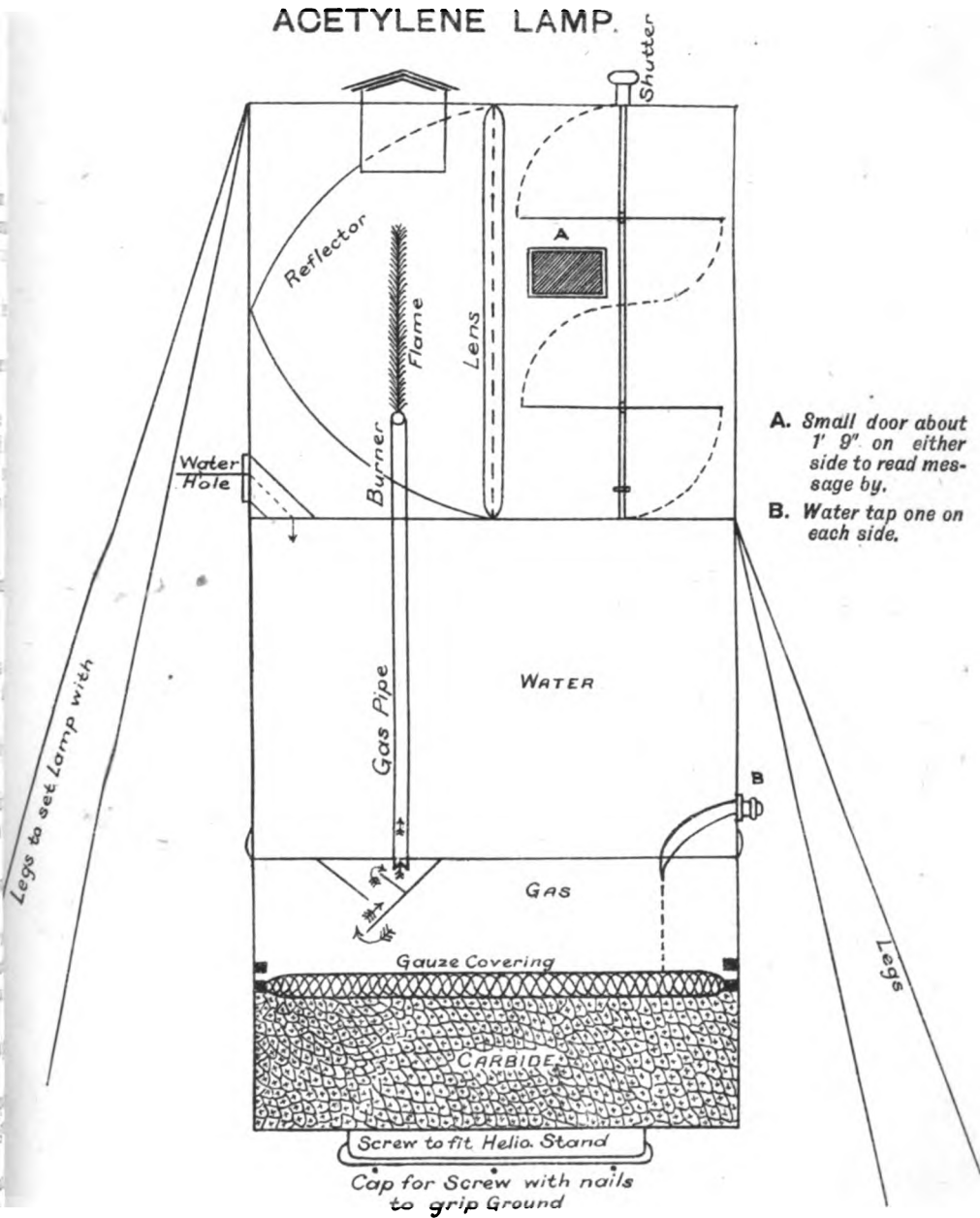
The water tank must contain one-third more water than is required, in order to keep up a good pressure as long as gas is being generated.

In another generator very similar to the above only non-automatic, the supply of water is regulated by hand according to the amount of gas required.

*The lamp* (*vide* Plate II).—Is contained in a rectangular japanned block tin box A B C D open at one end B C  $4'' \times 4'' \times 5\frac{1}{2}''$  a 3" condenser with a reflector attached is contained in a slide H I.

# Plate I.

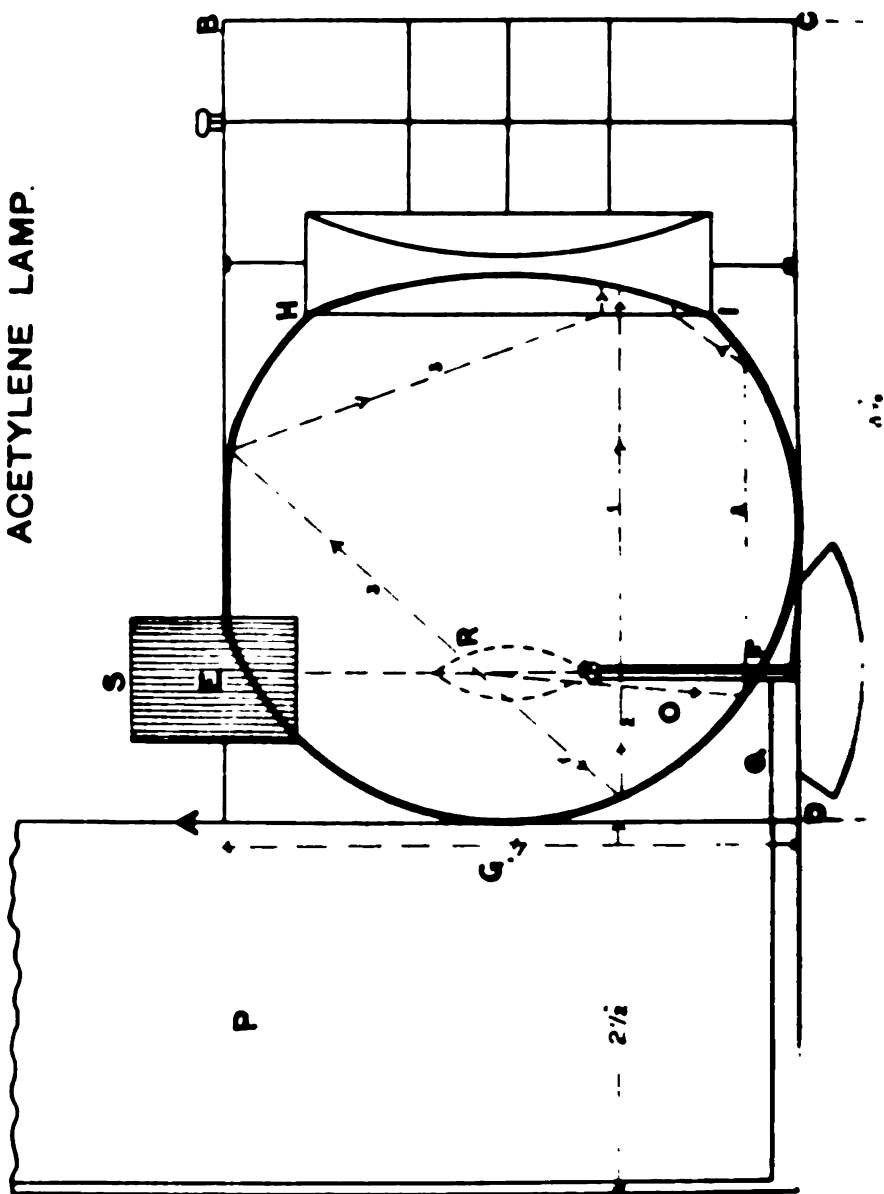
## ACETYLENE LAMP.







# ACETYLENE LAMP.



There are two reflectors (parabolic) E G F and E H I F, by means of which all reflected rays pass through the condenser by single or double reflectors.

The shutter B C is of the Indian pattern.

*The Burners.*—They are of different sizes, and by turning the indicator the size required is brought over the gas-pipe O.

The centre of the flame passes through R, the focus of the reflector E G F.

The gas-pipe leads to the generator P.

The gas is generated automatically by turning on the gas top Q.

One of the sides opens on hinges forming a door.

There are two small openings covered with gauze on both sides for reading and writing by. The light, escaping between the junction of the two reflectors, being sufficient for this.

A movable Mica chimney (S) is let through the top of the lamp to 1½" from R.

A sighting rod is used for setting the lamp. The lamp may be screwed on to a tripod or placed on the ground for signalling—

#### *Advantages.*

1. The weight of the lamp generator and carbide for 70 hours will be about 15 lbs. The lime light complete for the same work weighs about 70 lbs.

2. A 50 candle-power lamp is visible as far as the lime light. By increasing the size of the lamp, a 200 candle-power is possible, thereby greatly increasing the range of night signalling.

3. A minimum loss of light.

4. Instantaneous alteration of candle-power by moving the burner indicator.

5. The lamp can be used as a bull's-eye by unscrewing the front lens of the condenser.

This would be useful for finding an unknown station.

6. Coolness of the lamp. The heat given off by the acetylene gas, which is far less than that of lime light, passes upwards through the chimney.

7. Extreme portability. By using a detachable generator the lamp can be easily carried by a mounted signaller (attached to saddle).

8. Its strength. Everything in the lamp being a fixture, there is no danger from shaking.

9. Its simplicity compared with lime light.

10. Saving of transport.

The transport (signalling) of an army corps for 30 days would be reduced from about 8,000 lbs. to 220 lbs. by exchanging acetylene lamps for the lime light.

11. It can be used as a small search light.

#### *The disadvantages.*

1. The gas, if mixed with air, is an explosive.

2. The calcium carbide is easily affected by the state of the atmosphere.

3. The gas is very liable to break through the fittings. The amount of gas generated at any one time in the lamp is not sufficient to cause an explosion.

All carbide can be carried in hermetically sealed tubes to contain 1 lb. or less.

This would obviate all chance of explosion and protect the carbide against the effects of the atmosphere.

The leakage can only be overcome by using very accurate fittings and by carrying a small box of plaster of Paris to plug any leak that may appear.

The two inventions described above would appear to materially affect the transmission of messages in war and by their aid the rendering of reports from the independent cavalry patrols should be in most cases greatly accelerated.

Messages may be divided under three heads—

*1st.*—Those relating to the internal arrangements of an army ;  
Private and Press messages.

*2nd.*—Those relating to Intelligence.

*3rd.*—Those relating to the manœuvring of an army on the field of battle.

The first kind of messages should be transmitted by the field telegraph, assisted by visual signalling and wireless telegraphy, and all troops concerned in this work should be under the Director of Field Telegraphs. The lines of communication to be kept up will be from the base of operations to army head-quarters, and certain branch lines to detached posts and commanders of important units.

The second kind of messages pass from the advanced cavalry to army head-quarters. They would be transmitted by mounted orderlies, visual signalling and wireless telegraphy. The application of these means of transmission are so dependent on the movements of the advanced cavalry and the nature of the country that it is impossible for them to work under the Director of Field Telegraphs.

A signalling officer must be in charge, helped by the Intelligence Department, which will give him all necessary information as to what direction the most important messages are expected from nature of the country, etc.

They are therefore best under the Director of Signalling.

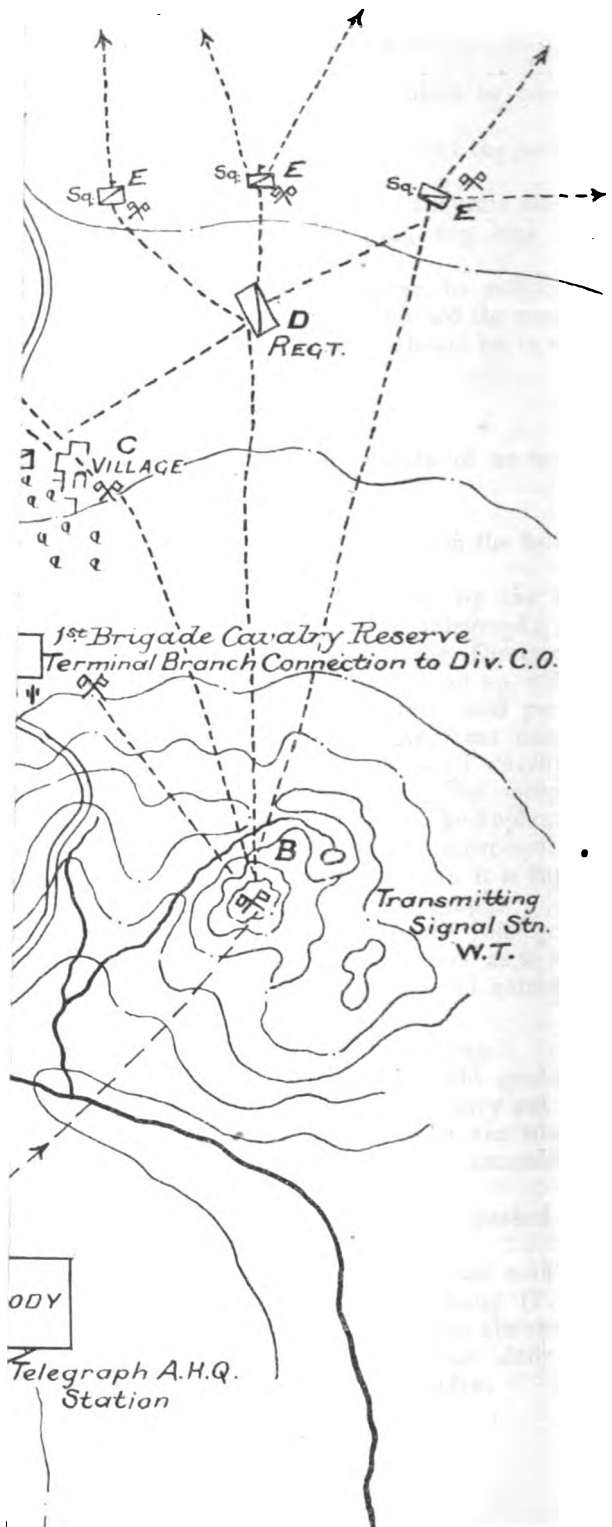
As the army approaches the field of battle, it would gradually absorb these advanced signallers; those required to carry out the transmission of the third kind of messages would retain the rôle of signallers, the remainder taking up other duties such as ammunition carriers, if required.

It has been said that the field telegraph should be pushed out with the advanced cavalry.

There is no doubt that the field telegraph can keep up with the cavalry, and that if they cannot, some one ought to be hung (P. 20, Lecture on Visual Signalling by Colonel Keyser), for, after the cavalry have extended a certain distance in front of the army, their daily rate of progression will be about the same as that of the infantry.







But there are serious disadvantages to the field telegraph accompanying the advanced cavalry. In the first place, the field telegraph cannot afford to risk its equipment and means of transport.

Then, in the event of the cavalry being suddenly forced to retire, they would be seriously hampered by the necessity of protecting the telegraph cable and transport.

The four-horse cart required to lay a section of a fast cable is restricted to roads or open country. And, thirdly, the wire can be easily cut and damaged in a hostile country.

Signalling has rarely been used for transmitting the reports of the advanced cavalry, the reasons being that the heliograph requires sun, the large flag can only be read with certainty at about 5 miles, and the lime light requires too much transport.

With the use of an acetylene lamp, easily carried by mounted signallers, messages could be sent in from long distances after sundown and before sunrise, reporting the observations made by day and those made at night respectively, the only possible impediments being mist or heavy rain, in which case a wireless telegraph apparatus stationed with the advanced cavalry's reserve would transmit from the mounted orderlies to army head-quarters the most important messages first if time would be saved by so doing. This wireless telegraph station could also always help visual signalling by transmitting the least important messages.

Signalling will always be used in preference owing to its greater rapidity.

An illustration of one of the instances when signalling would be useful is as follows—*vide* plan.

With an army advancing in a hostile country the disposition of the advanced means of communication could be as follows for the normal independent cavalry division formation :—

One section of visual signallers with wireless telegraphy apparatus to work a H A station (A) in the vicinity of army head-quarters. Unless this station (A) can be established close to army head-quarters, the field telegraph will lay a branch cable from their army head-quarter office to form a connection with A. This head-quarter station A to connect with a station (B) established as near as possible to the advanced cavalry reserve.

It would be composed of one company visual signallers with wireless telegraph apparatus to connect direct or through transmitting stations with A. The men required for transmitting stations to be furnished from this company. The regiment advancing in front of the advanced cavalry reserve to have one section establishing a station (C) to help in transmitting messages from the front if required.

Two sections of visual signallers to accompany each of the two regiments advanced to the flanks, one and a half sections remaining with each of the head-quarter squadrons forming stations D D, the remaining half sections being sent out in groups of two or three men with the four advanced squadrons forming stations E E E E.

The patrols sent out by these squadrons bring back their reports to E ; these are transmitted through D to the Cavalry Divisional Commander at B, who, after checking them, transmits them with his report

to army head-quarters A. Whenever possible all advanced stations will communicate direct with the cavalry reserve and not through the transmitting stations, and any message where the time taken in transmission is of great importance should be sent by the shortest line to army head-quarters, and at the same time repeated to the Commander of the advanced Cavalry Division.

Lateral communication would be established whenever possible.

All stations would be taken up as near the unit they belong to as possible.

When advancing, communication would be established if possible ; this could be done by leaving behind a few men at each station to rejoin their sections as soon as relieved by signallers from the advancing station or when new lines of communication have been established. When a report arrives at a station which cannot establish connection with another station, a copy of the report should be left and the original carried by one orderly in the usual manner.

As soon as this station establishes connection, it will send on this report unless it has already reached the receiving station.

A message that cannot be sent by day owing to clouds may still be sent at night and much time may be gained in the transmission to army head-quarters, but mounted orderlies must never depend on this ; they must always carry their messages on until they ascertain that they have been sent by signal.

No hard and fast rules can be laid down as to the exact number of these stations required and how to establish lines of communication, as in the advance of the cavalry the nature of the country, the number and direction of the roads and the attitude of the enemy have always to be taken into account.

The signallers required for a cavalry screen of one division may be estimated at two companies, 64 men, including two officers ; one and a half companies with the screen, the remaining half company as reserve at army head-quarters, to look after the supply of signalling stores and to replace casualties.

By the elimination of the lime light all the necessary apparatus can easily be carried by these signallers who will have to be mounted for this work. The average weight of signalling equipment per man (to work for 7 days) would be about  $7\frac{1}{2}$  lbs.

For a half section—

	lb.	oz.
One heliograph with stand (aluminium will reduce this)	10	9
Telescope with stand	2	14
Acetylene lamp and carbide	15	0
Extras	1	9
	<hr/>	<hr/>
	30	0

For a section the equipment could be distributed as follows :—

- 1 and 2 carry a heliograph each.
- 3 " 4 " generators and carbide.
- 5 " 6 " lamps and spare carbide.
- 7 carry heliograph and telescope stands and telescope.

Flags, message books, cooking utensils, etc., divided among the sections.

The only transport required would be a light cart for the wireless telegraph apparatus which could follow wherever the guns accompanying the advanced cavalry reserve go, in no way impeding the movements of this reserve. To carry out efficiently the work above-mentioned, signallers, as a whole, would require to undergo a far wider course of training than at present.

They would have to be taught to read and send at fast rates with the same accuracy as a telegraph clerk; to be instructed in the use of wireless telegraphy. They would have to be regularly practised in the tactical applications of signalling and to learn to ride both a horse and a bicycle.

It would appear to be better to do away with cavalry signallers altogether; they are the most expensive to maintain, and they cannot learn their cavalry work and to be good signallers at the same time. On the other hand, the infantry soldier, who joins the signallers after completing his recruit's drill, can still be kept up to a sufficient state of efficiency by attending two parades a week and all musketry parades. Undergoing a one month's course of riding school every year.

If the rest of his time were given up entirely to signalling, he should attain the required standard for this advanced work  $3\frac{1}{2}$  years after enlistment.

In this way half the signallers of every regiment would be prepared to join signalling companies when organized. These companies would be formed from regiments not taking part in the operations. The signallers of the regiments composing an army corps would always be retained for regimental work.

The field telegraph having a separate complement attached to them.

We now come to the question whether signalling to any large extent is possible in England and on the Continent, where climate, configuration of the ground, and thick woods prevail.

First, as to climate, with wireless telegraphy and a new lamp, this difficulty has been greatly reduced. Secondly, as to configuration of the ground. The plains of India are far less adapted to signalling. There are few high buildings, church spires, etc.; the undulation is less, but signalling was used on a fairly large scale at the Delhi Assemblage in 1885.

In peace manœuvres in Europe signallers cannot intrude in private houses, or cut down a tree that may be the only cause of the invisibility of two points, neither can they rig scaffolding planks on the rector's spire, and this appears to us the chief reasons why signalling is considered almost useless for the greater part of Europe.

Thirdly, thick woods are certainly an impediment, but they do not necessarily prevent signalling; a platform on a high tree will very often be visible from a ranger's cottage or a clearing.

If available, a small telegraph wire might be run through the wood.

A collapsable drum or ball suspended to a kite might be of great use; it can be made in a very short time by an unskilled workman out of cloth and wood. Green wood for the hoops of the drum, and a

small ring does for the pulley. A four-foot drum can be read through a telescope nearly 10 miles.

The Director of Signalling, when advancing with the cavalry screen, will always know what country he has to pass through and can make his arrangements accordingly to meet all obstacles that are likely to occur, and in most cases he should be able to find some means of overcoming them.

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#### ADDENDA.

##### *Wireless telegraph apparatus and acetylene signalling lamp for Hill Warfare.*

With a small wireless telegraph instrument to signal up to 2 miles, picquets will be able to signal by day and at night under cover and without fear of detection with the picquets on their right or left and with the main column.

All picquets could be withdrawn when required without attracting the enemy's attention to them by using a flag.

A small combined acetylene lamp and generator to signal for 2 miles would weigh about 2 lbs. 9 oz. with sufficient carbide to burn for 9 hours.

The light for that distance is better than B. B. lamp.

## TELEPHOTOGRAPHY IN MODERN WARFARE.

BY MAJOR J. B. LESLIE ROGERS, DEHRA DUN MOUNTED RIFLES.

It has become almost an axiom nowadays, that the British Empire, to its discredit, is always the last of the world powers to adopt the progressive discoveries of science for practical purposes. Countless instances could be cited to prove the existence of grounds for this general belief; and at the present moment even a semi-civilised people, like the Boers, are giving us many a severe object-lesson in this respect. Be the cause what it may, the fact remains that we are generally much too dilatory in taking up the many advantageous inventions and discoveries of modern times, more especially in matters military. With reference to the latter aspect of the question, we are, for instance, constantly being told with irritating reiteration, that such and such a reverse to our troops in Africa and elsewhere was caused by want of reliable information, defective scouting, ignorance of the configuration of the country, and so on, *ad nauseam*. These, however, are mere excuses, and excuses cannot be accepted as irrefutable reasons, or as any palliation of avoidable mistakes. The positions held by an enemy and the physical features of the seat of war *ought* to be known to every leader of troops; and with wireless telegraphy, the heliograph, balloon reconnaissance, and last but not least, telephotography, there cannot be any valid excuse for not having reliable data to act on,—except in some very unusual circumstances. Though the first three above-mentioned methods of acquiring information are being utilised to a certain extent, our military authorities have hitherto entirely failed to see the great possibilities open to the use of a telephotographic equipment, more especially if employed from a balloon. Experiments, it may be admitted, were tried with light instruments by the Intelligence Department in England, as far back as 1892. But the telephoto camera was then in its infancy, and very defective, when compared with its present high power efficiency. This defectiveness, coupled with adverse atmospheric conditions prevailing at home, very naturally produced results that were in those days considered unsatisfactory. From that time up till quite recently, this highly scientific instrument has stood condemned by our War Office, regardless of the many extraordinary improvements that have been made in perfecting its powers by the great specialists in this branch of photography. But it does not seem to have occurred to any one, that what may not suit the cloudy climate of England, might on the contrary produce most favourable results in countries, such as India, blessed with brilliant sunshine throughout the greater part of the year.

It will be advisable now to premise any further remarks on this subject, by briefly explaining what telephotography really means. The telephoto lens was first invented about nine years ago, and

placed almost simultaneously on the market by Mr. T. R. Dallmeyer in England, M. Duboseq in France, and Dr. Meithe in Germany; and since then there has been an increasing demand for these lenses, especially for purposes of long distance photography, and most of the continental nations have already adopted them for military purposes. The telephoto camera was first used in actual warfare, during the Chino-Japanese War of 1894; and some excellent telephotographs were taken by a Japanese officer in the naval engagement off the Yalu river in that year. One taken at a distance of over two miles, of the *Tie-yen*, one of the largest men-of-war in the Chinese navy, shows the vessel to be in a sinking condition, and the damage done by shot and shell is clearly discernible in the photograph. Our own War Office has, however, continued to look askance at this valuable instrument. But quite recently public pressure has compelled it to take up the subject; and we have lately heard that a solitary telephoto camera of small dimensions and low power has been despatched to South Africa. This diminutive instrument has been fitted to a bicycle. When it is considered that the other military powers are at present using large telephoto cameras of great power fitted to balloons, men-of-war, carts, etc., it will readily be conceded that we are not giving a fair and favourable trial to telephotography in the present war. To eschew all technical terms, in plain language, telephotography is simply the use of a special and variable long focus telescopic lens, optically adjusted to the lens of a good photographic camera. By this combination, photographs of objects a long distance off can be taken as if the operator was comparatively close to them. If, for example, the resulting picture by an ordinary camera of an object ten miles away, measured on paper, say one inch square, the same picture if taken with a telephoto lens, from the same spot, would measure 16, 32 or 64 inches square, and so on, according to the magnifying powers of the lens and the size of the camera used. It can now easily be realised what an enormous advantage such an instrument would confer on a general, either defending, or about to attack, a fortified position. The topographical configuration of the country, the direction of the entrenchments, the position of the larger guns, the massing of the enemy, etc., would all be clearly depicted on a handy sheet of paper. This balloon telephotograph, supplemented with a few taken along the horizon by the same means, would be simply invaluable from a military point of view. The photographic range of the telephoto camera may be considered as unlimited. Desirable telephotographs have been produced at a distance of over forty miles, but really valuable images on a large scale can always be taken with facility from distances beyond the reach of rifle and gun, that is, from two to ten miles. But as stated before, given a powerful lens and a clear atmosphere, the range of the telephoto camera will be found to be practically unlimited. There is yet another simple method, though not to be generally recommended, of taking enlarged long distance views by means of a series of ordinary stand cameras which is as follows: a camera is set up for instance and focussed on a rock, say a thousand yards away, another camera is then set up behind, and

focused on the ground glass of the first in such a manner as to enlarge the image of the rock. The focussing cloth is then thrown over the two cameras so as to span the intervening space, and exclude the sun. The ground glass of the first instrument is then removed, and the exposure made. The result is an enlarged picture of the rock, which will appear as though taken from quite close by. If a still larger magnification is required, it is only necessary to add one or more cameras to the first series. But for ease of manipulation, and clear definition, this latter method does not compare favourably with the enlarged direct picture, taken with a good telephoto camera.

The introduction of all new discoveries is generally followed by a good deal of adverse criticism ; and the telephoto process has, it may well be imagined, not escaped those who make a point of objecting to everything new. For example, it has been stated that an ordinary telescope will show all that is necessary of distant objects ; and that the reports and sketches of scouts in war will furnish all the information that can reasonably be required,—therefore why bother about telephotography ? Again, it has been fallaciously urged that an ordinary photograph of a distant object, if enlarged afterwards, will give quite as good results, as a direct enlarged picture taken by a telephoto camera. These objections will now be dealt with, and shown to be quite untenable. To begin with the telescope : it will be at once conceded that a powerful telescope will of course show objects clearly and with very little trouble ; but a general conducting a campaign cannot possibly be everywhere with his telescope, even if he had not other important duties to perform. He must necessarily depend on the telescopic observations of others ; and as it is a psychological fact that no two men have the faculty of describing the same thing exactly alike, the reports sent in by such observers would not leave so convincing an impression on a general's mind, as would be the case if such reports were supplemented with long distance large telephotographs of the points reported on. The same arguments hold good regarding the reports and rough sketches sent in by various scouts. It will, therefore, be seen that telephotography does not aim at altogether abolishing telescopes and military scouting, but puts forward its claim as being a very powerful adjunct to these means of military observation. Lastly, there is the plausible comparison made between ordinary subsequent enlargement of a long distance photograph, and the direct enlargement by telephotography. The following will show that the advantages lie wholly with the latter. As a preliminary it must be conceded, that the clearer the definition of details in a large photograph, the more valuable it will be for military purposes. Now, in making ordinary enlargements from small pictures, you must necessarily disperse the minute particles of colour matter that form the picture, and this immediately blurs the details and outlines ; and the greater the magnification by this method, the greater must be the consequent blurring and indistinctness. Besides, some negatives on glass, or film, cannot be enlarged at all, owing to inherent defects ; while even those that do lend themselves to this process can only be enlarged to a certain proportion, beyond that point the blurring is so great that the picture is



practically destroyed. In small photographs, the chemical particles that form the details of the picture, coalesce to a certain extent, and show as black patches ; these latter, if subsequently enlarged, only appear larger, but give little or no further distinctness of detail. Besides, whilst telephotography entails only one operation, ordinary enlarging is a double process : you first have to take your photograph, and then afterwards enlarge it by another apparatus. This means greater expense and trouble, and an appreciable loss of time, all of which are decided disadvantages in time of war, and lastly, if for any reason it was necessary to produce an enlargement, of say a fortified position, a better and much larger result could be procured from the already magnified telephoto, than from an ordinary small photograph. It will therefore be realized that there is absolutely everything in favour of direct long distance telephotography.

A few instances of practical application of telephotography in war will not be out of place here. In the navy, for example, specially constructed long-range instruments of superior power and rapidity could easily be utilised from men-of-war, to procure images of foreign coast defences, from a greater distance than the ordinary three-mile limit, and on a sufficiently large scale to be of very high value, in the event of an attack or bombardment being contemplated. While, with our land forces, the utility of these instruments would be still more marked. In the defence, for instance, telephotographs taken at every available opportunity of the enemy's positions, would clearly show the exact movements of the besiegers, and any fresh entrenchments, etc., that they may have thrown up over-night. Such exact information would undoubtedly be of great value to the defence in altering their own dispositions, and planning counter-attacks. On the other hand, the attack would benefit even to a greater extent. On the Tugela and Modder rivers, for example, had a series of telephotographs been taken, both by balloon and on the ground, of all the Boer positions, our lines of attack could clearly have been laid down on these photographs with ordinary pen and ink, while every prominent point would also have had a number put on it for further guidance, and for reference to any subsequent orders that might be issued during the course of the battle. Copies of these marked photographs could then have been distributed among all the principal leaders, and the attack carried out with almost mathematical precision. Under such conditions there could be no possibility of confusion of orders, or misdirection of advance, such as have unfortunately so frequently occurred of late, both in our frontier and South African campaigns. Such instances of the great utility of telephotography might be multiplied indefinitely, but enough has been stated to show that this valuable adjunct to military observation can no longer be wisely ignored by our forces. And, finally, it cannot be denied that all such telephotographs would undoubtedly furnish valuable records of the war to all future historians and military students.

There has been a certain amount of wild criticism in the press of late against telephotography, but the internal evidence goes to show that the adverse remarks have invariably been made by those who have had little or no personal acquaintance with the subject. The fact that

these scientific instruments have now a recognised place in the armies and navies of all civilised powers ought to be sufficiently convincing that the telephoto camera has some real military value. This eminently practical branch of military photography can no longer be consistently ignored by us, and the Indian Government would be wise in losing no time in taking up the subject seriously. The gain to our army in the field would certainly be on a par with that conferred by the telegraph, the heliograph, and the radiograph, all of which are nowadays considered absolute necessities in every civilised army. The formation of a small special class for instructional purposes is strongly advised preferably in the hills, from where trained telephotographists could be sent to every divisional command in India. Selected volunteers should also be encouraged to join this class; and there cannot be any doubt that many of the more advanced and practical volunteer corps would take up this interesting subject with the utmost enthusiasm. During peace-time much valuable work could be done in telephotographing the environments of our fortified posts throughout the country, as also the various strategic passes on our frontiers; while in the cold weather manœuvres, these instruments could either independently, or in conjunction with balloons, be extensively employed as valuable aids to the strategy and tactics of our army. We have lost much regrettable ground already as a military nation, by our tardiness in adopting the many modern, scientific adjuncts to warfare, and it is now devoutly hoped that the eminently useful telephoto camera will no longer be sacrificed to our old-world and unpractical conservatism in such matters of national importance as the high efficiency of our army.

## THE REVIVAL OF COSSACK TACTICS.

BY CAPTAIN R. G. BURTON, 1ST INFANTRY, HYDERABAD CONTINGENT.

A somewhat spasmodic interest has been excited from time to time in this journal, and elsewhere in our military press, on the subject of the national military evolutions of the Cossacks, known as the *Liuzi*. This interest was first aroused by the writings of an influential party in the Russian military papers and magazines, who, on the ground that the Cossacks had degenerated, and were suffering from the effects of over-dragooning and a want of consideration of their national attributes, advocated a reversion to their former tactics, which had fallen into disuse, and were remembered only as a tradition by means of which the horsemen of the Don had redeemed themselves famous in bygone days, and had in particular won great glory during the retreat of Napoleon's Grand Army from Russia in 1812.

In the various writings referred to, the causes of Cossack decadence were discussed, the historical aspect of the question was reviewed, the archives of the military staff at St. Peterburg were ransacked; traditions were sought out and collected; and the evolutions of the *Liuzi*, in so far as they left themselves to be written, were fully resuscitated on paper in military literature, and fighting tactical manoeuvres were rediscovered. So far the agitation in favour of a reform, or rather revival of Cossack tactics was confined to a strong party in the military journals in which, even in Russia, there appears to be a good deal of freedom of discussion as long as politics are avoided. This found an echo in the German Press, where anti-autocratic writers considered the question of being introduced by the revival of these tactics to be of such importance that they urged upon the military department the advisability of devising some means of action against the *Liuzi* for use in case of necessity.

In our own press the matter was discussed in various papers published in this journal in 1894-95, when the historical aspect of the case was reviewed and dated upon at length by the present writer in the United Service Magazine of September 1895. Those who take an interest in the question may refer to the journal referred to, where a full exposition of the evolutions of the *Liuzi* will be found. I do not propose to restate those evolutions, they have been fully set forth in the publications referred to, but to make a historical tactical point of view, and it is unnecessary to recapitulate them.

But so far as we are concerned the matter appears to have been consigned to oblivion without any practical end or no having been

arrived at with regard to the tactics advisable for opposition to the manœuvres peculiar to the Cossacks. To formulate any ideas for such tactics is not my intention; nor, being an infantry officer, do I feel myself competent to undertake such a task. What I desire is to direct attention to the fact that ancient tactical manœuvres of the Cossacks, regarding which provisional instructions were issued in Russia in 1894, have now passed beyond the phase of discussion in Russian military literature, have obtained full official recognition, and have been officially revived and adopted. This being the case, and in view of the not very improbable contingency of our some day finding ourselves face to face with these formidable tactics, it would surely be well if some competent authority would devise measures for opposing them, and adapt such measures to the evolutions of our cavalry, and especially of our native cavalry, which, from its nature and composition, would appear to be peculiarly suited to this purpose.

New Instructions for the Cossack *lava* were issued by the Russian Ministry of War on the 4th April 1899. The following summary of their contents is obtained from Russian sources.

The new Instructions are divided into four chapters comprising 19 pages. In the first chapter general instructions regarding the *lava* are given, and a point especially insisted upon is that the formation should be characterised by a combination of movements in open and close order. Thus the new Instructions revive that peculiarity of the action of the *lava*, the gradual loss of which by the Cossacks had reduced the operation to a mere attack in open order. The *lava* is to be adapted to the varying circumstances of war, and in particular (1) to carrying out reconnaissances in force; (2) opposing hostile reconnaissances; (3) as a screen for covering manœuvres; (4) for distracting the attention of the adversary from the direction chosen for attack, and generally to induce him to undertake mistaken operations, and to lure him into ambushes; (5) for pursuing a retreating foe. Here, of course, only the principal cases for the adoption of the *lava* are cited; to recount them all is unnecessary. Every commander can apply the *lava*, subject to circumstances, to all the operations of Cossack warfare. The chapter contains a concise and clear account of the manœuvres of the *lava*, which are intangible in character and ever-varying according to circumstances, and concludes with the observation that such tactics can only be successful when they are unexpected, and unintelligible to the enemy. The regiment is the unit for *lava* formations, as bodies of less strength have not sufficient depth, combined with a corresponding breadth of front for enveloping the flanks of the hostile force. Chapter II is devoted to the training of *sotnias*. The *sotnia* can act successfully in *lava* formation when supported by some other unit giving it depth. Particular attention is directed to individual instruction, and skill in the use of arms, and to firing from horseback, as the individuality of the warrior is especially valuable in these operations. The *lava* formation of a *sotnia* consists of an advanced party with a support of not less than one troop. The advanced party is composed of half-troop "links," directed by the *uradniks* of the right and left flank troops; each "link" is commanded by a skilled and experienced Cossack. The men composing the "links" move at

intervals of five paces from one another on open ground, and the support follows at a distance of from 50 to 100 paces in rear.

The movements of the formation are directed by the *zastava* by means of verbal commands, signals, and conventional signs, including whistles and imitations of the cries of wild beasts and birds. The *zastava* can open out, close in like wings, change direction on any point or on the *shtab*, and finally in case of extremity retire separately in order to assemble subsequently at an appointed spot. In a word, the *zastava* must manœuvre skilfully, and thus act as a preparatory point for attack—a period altogether absent in the action of regular cavalry.

In Chapter III the fighting formation of a regiment in *zastava* is reviewed. The regiment in this case has two, three, or four *zastavas* with their supports in its first line, and the remainder at a distance of about 500 yards, in reserve or ambush. (Forming the *zastava* formation is described and illustrated by a historical example in the Cavalry Service Magazine of September 1896.) The commander of the regiment, with the assistance of his staff officers, directs the operation. The *zastava*, harassing the enemy, seizes a favourable moment to throw itself upon him, either in front only or from several directions simultaneously, recollecting only that they must strike together, and then close in at a gallop.

Finally, in Chapter IV, it is observed that the operations of the *zastava* can be equally successfully carried out by Cossack brigades, divisions, and corps, when they will be subject to the general rules laid down in the fourth part of the regulations for the cavalry, with such additions and alterations as may be required by the circumstances of Cossack formations. These large units will use the *zastava* formation not exclusively in action, but for covering troops on the march, for which purpose they will be thrown forward as a screen in the enemy's direction. Finally, these larger *zastavas* can render invaluable service in actions preceding a decisive battle, and during the latter can contribute to conclusive success.

From this it may be seen that the new instructions, in which have been included all the fundamental peculiarities of the ancient formation of the *zastava*, give an impetus towards the revival of that historically proved method of operations of the Cossacks, with the result which they at one time successfully opposed the best European cavalry.

## RUSSIA AND ENGLAND ON THE ASIATIC CONTINENT.

LECTURE DELIVERED IN THE MILITARY CLUB, TASHKENT, ON 7TH APRIL 1899 BY LIEUTENANT-COLONEL GRULIEF OF THE RUSSIAN GENERAL STAFF.

\* TRANSLATED BY MAJOR E. J. MEDLEY, 17TH BENGAL CAVALRY.

### INTRODUCTION.

At a first glance the relations existing between Russia and England have a very remarkable appearance. Nowhere—neither in Asia, nor in any other part of the world—are these powers in immediate contact with each other. Consequently it would seem that there is absolutely no reason why any difference should ever occur between them. Nay more,—Russia is an agricultural nation, while England is entirely concerned with commerce and manufactures. There would therefore appear to be no cause for quarrels.

Again, Russia is a continental power : England a sea and colonial one.

Thus it would appear to be absolutely impossible for these two nations to tread on each other's pet corns in any way whatever.

Likewise it is difficult to allow that in their mutual relations there is any innate hatred between Russians and Englishmen. There is none such, nor has any such ever existed. On the contrary, during the whole of the first half of the present century our upper classes were devoted admirers of English Institutions and the English language, imitating the English even in their food and in their dress : for many years our literature was illumined by the genius of English thinkers and poets : who, amongst us, does not know Shakespeare, Newton, Byron, Darwin, and many others.

In a word it would appear as if there were absolutely no place, not only for mutual enmity, but even for mutual misunderstandings and disputes.

As a matter of fact, however, we find that both in Russia and in England, yea and throughout the world, there is a firm impression that a conflict between Russia and England in Asia is inevitable.

In the short time at my disposal to-day I have no intention of discussing the reasons for the prevalence of this idea. In the first place, the time is too short, and in the next we are not here concerned with politics. At the same time it must be admitted that military men, who wish to find out matters for themselves, and who take an interest

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\* The translator is not responsible for the confusion of metaphors arising in many instances in the above lecture.

placed almost simultaneously on the market by Mr. T. R. Dallmeier in England, M. Duboseq in France, and Dr. Meitke in Germany; and since then there has been an increasing demand for these lenses, especially for purposes of long distance photography, and most of the combatant nations have already adopted them for military purposes. The telephoto camera was first used in actual warfare, during the Russo-Japanese War of 1904; and some excellent telephotographs were taken by a Japanese officer in the naval engagement off the Yalu river that year. One taken at a distance of over two miles, of the *Tsushima*, one of the largest men-of-war in the Chinese navy, shows the vessel to be in a sinking condition, and the damage done by shot and shell is clearly discernible in the photograph. Our own War Office has, however, continued to look askance at this valuable instrument. But quite recently public pressure has compelled it to take up the subject; and we have lately heard that a solitary telephoto camera of small dimensions and low power has been despatched to South Africa. This diminutive instrument has been fitted to a telescope. When it is considered that the other military powers are at present using large telephoto cameras of great power fitted to balloons, men-of-war, carts, etc., it will readily be conceded that we are not giving a fair and favourable trial to telephotography in the present war. To eschew all technical terms, in plain language, telephotography is simply the use of a special and variable long focus telescope optically adjusted to the lens of a good photographic camera. By this combination, photographs of objects at long distances can be taken as if the operator was comparatively close to them. For example, the resulting picture by an ordinary camera of an object a mile away, measured on paper, say one inch square, the same picture if taken with a telephoto lens, from the same spot, would measure 32 or 64 inches square, and so on, according to the magnifying power of the lens and the size of the camera used. It can now be realised what an enormous advantage such an instrument would offer on a general, either defending, or about to attack, a fort or position. The topographical configuration of the country, the direction of the entrenchments, the position of the larger guns, the massing of the enemy, etc., would all be clearly depicted on a handy sheet of paper. This balloon telephotograph, supplemented with a few taken along the horizon by the same means, would be simply invaluable to a military point of view. The photographic range of the telephoto camera may be considered as unlimited. Desirable telephotographs have been produced at a distance of over forty miles, but more valuable images on a large scale can always be taken with telephoto cameras from distances beyond the reach of rifle and gun, that is from ten to ten miles. But as stated before, given a powerful lens and a large camera, the range of the telephoto camera will be found to be practically unlimited. There is yet another simple method, though not to be generally recommended, of taking enlarged long distance views by means of a series of ordinary stand cameras which, as follows, a camera is set up for instance and focused on a vessel, say a thousand yards away, another camera is then set up behind it, and

focussed on the ground glass of the first in such a manner as to enlarge the image of the rock. The focussing cloth is then thrown over the two cameras so as to span the intervening space, and exclude the sun. The ground glass of the first instrument is then removed, and the exposure made. The result is an enlarged picture of the rock, which will appear as though taken from quite close by. If a still larger magnification is required, it is only necessary to add one or more cameras to the first series. But for ease of manipulation, and clear definition, this latter method does not compare favourably with the enlarged direct picture, taken with a good telephoto camera.

The introduction of all new discoveries is generally followed by a good deal of adverse criticism ; and the telephoto process has, it may well be imagined, not escaped those who make a point of objecting to everything new. For example, it has been stated that an ordinary telescope will show all that is necessary of distant objects ; and that the reports and sketches of scouts in war will furnish all the information that can reasonably be required,—therefore why bother about telephotography ? Again, it has been fallaciously urged that an ordinary photograph of a distant object, if enlarged afterwards, will give quite as good results, as a direct enlarged picture taken by a telephoto camera. These objections will now be dealt with, and shown to be quite untenable. To begin with the telescope : it will be at once conceded that a powerful telescope will of course show objects clearly and with very little trouble ; but a general conducting a campaign cannot possibly be everywhere with his telescope, even if he had not other important duties to perform. He must necessarily depend on the telescopic observations of others ; and as it is a psychological fact that no two men have the faculty of describing the same thing exactly alike, the reports sent in by such observers would not leave so convincing an impression on a general's mind, as would be the case if such reports were supplemented with long distance large telephotographs of the points reported on. The same arguments hold good regarding the reports and rough sketches sent in by various scouts. It will, therefore, be seen that telephotography does not aim at altogether abolishing telescopes and military scouting, but puts forward its claim as being a very powerful adjunct to these means of military observation. Lastly, there is the plausible comparison made between ordinary subsequent enlargement of a long distance photograph, and the direct enlargement by telephotography. The following will show that the advantages lie wholly with the latter. As a preliminary it must be conceded, that the clearer the definition of details in a large photograph, the more valuable it will be for military purposes. Now, in making ordinary enlargements from small pictures, you must necessarily disperse the minute particles of colour matter that form the picture, and this immediately blurs the details and outlines ; and the greater the magnification by this method, the greater must be the consequent blurring and indistinctness. Besides, some negatives on glass, or film, cannot be enlarged at all, owing to inherent defects ; while even those that do lend themselves to this process can only be enlarged to a certain proportion, beyond that point the blurring is so great that the picture is



practically destroyed. In small photographs, the chemical particles that form the details of the picture, coalesce to a certain extent, and show as black patches ; these latter, if subsequently enlarged, only appear larger, but give little or no further distinctness of detail. Besides, whilst telephotography entails only one operation, ordinary enlarging is a double process : you first have to take your photograph, and then afterwards enlarge it by another apparatus. This means greater expense and trouble, and an appreciable loss of time, all of which are decided disadvantages in time of war, and lastly, if for any reason it was necessary to produce an enlargement, of say a fortified position, a better and much larger result could be procured from the already magnified telephoto, than from an ordinary small photograph. It will therefore be realized that there is absolutely everything in favour of direct long distance telephotography.

A few instances of practical application of telephotography in war will not be out of place here. In the navy, for example, specially constructed long-range instruments of superior power and rapidity could easily be utilised from men-of-war, to procure images of foreign coast defences, from a greater distance than the ordinary three-mile limit, and on a sufficiently large scale to be of very high value, in the event of an attack or bombardment being contemplated. While, with our land forces, the utility of these instruments would be still more marked. In the defence, for instance, telephotographs taken at every available opportunity of the enemy's positions, would clearly show the exact movements of the besiegers, and any fresh entrenchments, etc., that they may have thrown up over-night. Such exact information would undoubtedly be of great value to the defence in altering their own dispositions, and planning counter-attacks. On the other hand, the attack would benefit even to a greater extent. On the Tugela and Modder rivers, for example, had a series of telephotographs been taken, both by balloon and on the ground, of all the Boer positions, our lines of attack could clearly have been laid down on these photographs with ordinary pen and ink, while every prominent point would also have had a number put on it for further guidance, and for reference to any subsequent orders that might be issued during the course of the battle. Copies of these marked photographs could then have been distributed among all the principal leaders, and the attack carried out with almost mathematical precision. Under such conditions there could be no possibility of confusion of orders, or misdirection of advance, such as have unfortunately so frequently occurred of late, both in our frontier and South African campaigns. Such instances of the great utility of telephotography might be multiplied indefinitely, but enough has been stated to show that this valuable adjunct to military observation can no longer be wisely ignored by our forces. And, finally, it cannot be denied that all such telephotographs would undoubtedly furnish valuable records of the war to all future historians and military students.

There has been a certain amount of wild criticism in the press of late against telephotography, but the internal evidence goes to show that the adverse remarks have invariably been made by those who have had little or no personal acquaintance with the subject. The fact that

these scientific instruments have now a recognised place in the armies and navies of all civilised powers ought to be sufficiently convincing that the telephoto camera has some real military value. This eminently practical branch of military photography can no longer be consistently ignored by us, and the Indian Government would be wise in losing no time in taking up the subject seriously. The gain to our army in the field would certainly be on a par with that conferred by the telegraph, the heliograph, and the radiograph, all of which are nowadays considered absolute necessities in every civilised army. The formation of a small special class for instructional purposes is strongly advised preferably in the hills, from where trained telephotographers could be sent to every divisional command in India. Selected volunteers should also be encouraged to join this class; and there cannot be any doubt that many of the more advanced and practical volunteer corps would take up this interesting subject with the utmost enthusiasm. During peace-time much valuable work could be done in telephotographing the environments of our fortified posts throughout the country, as also the various strategic passes on our frontiers; while in the cold weather manœuvres, these instruments could either independently, or in conjunction with balloons, be extensively employed as valuable aids to the strategy and tactics of our army. We have lost much regrettable ground already as a military nation, by our tardiness in adopting the many modern, scientific adjuncts to warfare, and it is now devoutly hoped that the eminently useful telephoto camera will no longer be sacrificed to our old-world and unpractical conservatism in such matters of national importance as the high efficiency of our army.

## THE REVIVAL OF COSSACK TACTICS.

BY CAPTAIN R. G. BURTON, 1ST INFANTRY, HYDERABAD CONTINGENT.

A somewhat spasmodic interest has been excited from time to time in this journal, and elsewhere in our military press, on the subject of the national military evolutions of the Cossacks known as the *lava*. This interest was first aroused by the writings of an influential party in the Russian military papers and magazines, who, on the ground that the Cossacks had degenerated, and were suffering from the effects of over-dragooning and a want of consideration of their national attributes, advocated a reversion to their former tactics, which had fallen into desuetude, and were remembered only as a tradition by means of which the horsemen of the Don had rendered themselves famous in bygone days, and had in particular won great glory during the retreat of Napoleon's Grand Army from Russia in 1812.

In the various writings referred to, the causes of Cossack decadence were discussed; the historical aspect of the question was reviewed; the archives of the military staff at St. Petersburg were ransacked; traditions were sought out and collated; and finally the evolutions of the *lava*, in so far as they lent themselves to definition, were fully resuscitated on paper in military literature, and forgotten tactical manœuvres were rediscovered. So far the agitation in favour of a reform, or rather revival of Cossack tactics, was confined to a strong party in the military journals, in which, even in Russia, there appears to be allowed much freedom of discussion, so long as politics are avoided. This found an echo in the German Press, where authoritative writers considered the questions called into being by the revival of these tactics to be of such importance that they urged upon the military department the advisability of devising some means of action against the *lava* for use in case of necessity.

In our own press the matter was discussed in various papers published in this journal in 1894-95, whilst the historical aspect of the case was reviewed and dilated upon at length by the present writer in the United Service Magazine of September 1896. Those who take an interest in the question may refer to the journals quoted, where a full exposition of the evolutions of the *lava* will be found. I do not propose to restate those evolutions; they have been fully set forth in the publications referred to, both from a historical and tactical point of view, and it is unnecessary to recapitulate them.

But, so far as we are concerned, the matter appears to have been consigned to oblivion without any practical conclusions having been

arrived at with regard to the tactics advisable for opposition to the manœuvres peculiar to the Cossacks. To formulate any ideas for such tactics is not my intention; nor, being an infantry officer, do I feel myself competent to undertake such a task. What I desire is to direct attention to the fact that ancient tactical manœuvres of the Cossacks, regarding which provisional instructions were issued in Russia in 1894, have now passed beyond the phase of discussion in Russian military literature, have obtained full official recognition, and have been officially revived and adopted. This being the case, and in view of the not very improbable contingency of our some day finding ourselves face to face with these formidable tactics, it would surely be well if some competent authority would devise measures for opposing them, and adapt such measures to the evolutions of our cavalry, and especially of our native cavalry, which, from its nature and composition, would appear to be peculiarly suited to this purpose.

New Instructions for the Cossack *lava* were issued by the Russian Ministry of War on the 4th April 1899. The following summary of their contents is obtained from Russian sources.

The new Instructions are divided into four chapters comprising 19 pages. In the first chapter general instructions regarding the *lava* are given, and a point especially insisted upon is that the formation should be characterised by a combination of movements in open and close order. Thus the new Instructions revive that peculiarity of the action of the *lava*, the gradual loss of which by the Cossacks had reduced the operation to a mere attack in open order. The *lava* is to be adapted to the varying circumstances of war, and in particular (1) to carrying out reconnaissances in force; (2) opposing hostile reconnaissances; (3) as a screen for covering manœuvres; (4) for distracting the attention of the adversary from the direction chosen for attack, and generally to induce him to undertake mistaken operations, and to lure him into ambushes; (5) for pursuing a retreating foe. Here, of course, only the principal cases for the adoption of the *lava* are cited; to recount them all is unnecessary. Every commander can apply the *lava*, subject to circumstances, to all the operations of Cossack warfare. The chapter contains a concise and clear account of the manœuvres of the *lava*, which are intangible in character and ever-varying according to circumstances, and concludes with the observation that such tactics can only be successful when they are unexpected, and unintelligible to the enemy. The regiment is the unit for *lava* formations, as bodies of less strength have not sufficient depth, combined with a corresponding breadth of front for enveloping the flanks of the hostile force. Chapter II is devoted to the training of *sotnias*. The *sotnia* can act successfully in *lava* formation when supported by some other unit giving it depth. Particular attention is directed to individual instruction, and skill in the use of arms, and to firing from horseback, as the individuality of the warrior is especially valuable in these operations. The *lava* formation of a *sotnia* consists of an advanced party with a support of not less than one troop. The advanced party is composed of half-troop "links," directed by the *uradniks* of the right and left flank troops; each "link" is commanded by a skilled and experienced Cossack. The men composing the "links" move at

intervals of five paces from one another on open ground, and the support follows at a distance of from 50 to 100 paces in rear.

The movements of the formation are directed by the *sotnik* by means of verbal commands, signals, and conventional signs, including whistles and imitations of the cries of wild beasts and birds. The *lava* can open out, close in like wings, change direction on any object or on the *sotnik*, and finally in case of extremity retire separately in order to assemble subsequently at an appointed spot. In a word, the *lava* must manœuvre skilfully, and thus act as a preparatory period for attack—a period altogether absent in the action of regular cavalry.

In Chapter III the fighting formation of a regiment in *lava* is reviewed. The regiment in this case has two, three or four *sotnias* with their supports in its first line, and the remainder at a distance of about 500 yards, in reserve or ambush. (Forming the *venter*, which is described and illustrated by a historical example in the United Service Magazine of September 1896.) The commander of the regiment, with the assistance of his staff officers, directs the operations. The *lava*, harassing the enemy, seizes a favourable moment to throw itself upon him, either in front only or from several directions simultaneously, recollecting only that they must strike together, and therefore close in at a gallop.

Finally, in Chapter IV, it is observed that the operations of the *lava* can be equally successfully carried out by Cossack brigades, divisions, and corps, when they will be subject to the general rules laid down in the fourth part of the regulations for the cavalry, only with such additions and alterations as may be required by the circumstances of Cossack formations. These large units will adopt the *lava* formation not exclusively in action, but for covering troops on the march, for which purpose they will be thrown forward as a screen in the enemy's direction. Finally, these larger *lava* formations can render invaluable service in actions preceding a decisive battle, and during the latter can contribute to conclusive success.

From this it may be seen that the new Instructions, in which have been included all the fundamental peculiarities of the ancient formation of the *lava*, give an impetus towards the revival of that historically-proved method of operations of the Cossacks, with the aid of which they at one time successfully opposed the best European cavalry.

## RUSSIA AND ENGLAND ON THE ASIATIC CONTINENT.

LECTURE DELIVERED IN THE MILITARY CLUB, TASHKENT, ON 7TH  
APRIL 1899 BY LIEUTENANT-COLONEL GRULIEF OF THE RUSSIAN  
GENERAL STAFF.

\* TRANSLATED BY MAJOR E. J. MEDLEY, 17TH BENGAL CAVALRY.

### INTRODUCTION.

At a first glance the relations existing between Russia and England have a very remarkable appearance. Nowhere—neither in Asia, nor in any other part of the world—are these powers in immediate contact with each other. Consequently it would seem that there is absolutely no reason why any difference should ever occur between them. Nay more,—Russia is an agricultural nation, while England is entirely concerned with commerce and manufactures. There would therefore appear to be no cause for quarrels.

Again, Russia is a continental power : England a sea and colonial one.

Thus it would appear to be absolutely impossible for these two nations to tread on each other's pet corns in any way whatever.

Likewise it is difficult to allow that in their mutual relations there is any innate hatred between Russians and Englishmen. There is none such, nor has any such ever existed. On the contrary, during the whole of the first half of the present century our upper classes were devoted admirers of English Institutions and the English language, imitating the English even in their food and in their dress : for many years our literature was illumined by the genius of English thinkers and poets : who, amongst us, does not know Shakespeare, Newton, Byron, Darwin, and many others.

In a word it would appear as if there were absolutely no place, not only for mutual enmity, but even for mutual misunderstandings and disputes.

As a matter of fact, however, we find that both in Russia and in England, yea and throughout the world, there is a firm impression that a conflict between Russia and England in Asia is inevitable.

In the short time at my disposal to-day I have no intention of discussing the reasons for the prevalence of this idea. In the first place, the time is too short, and in the next we are not here concerned with politics. At the same time it must be admitted that military men, who wish to find out matters for themselves, and who take an interest

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\* The translator is not responsible for the confusion of metaphors arising in many instances in the above lecture.

in questions of strategy, are forced to study the political currents which have carried first one and then another military event into the international life of a country.

We will, however, somewhat limit the question we are going to discuss to-day, and we will confine ourselves to the general characteristics of the progressive advance of Russia and England over the continent of Asia and their mutual relations in this part of the world.

And such a discussion is eminently *à propos* at this moment, for these powers have just taken up new positions on the continent of Asia, without having yet squared up their old accounts.

## I.

In the progressive advance of Russia and England on the continent of Asia there is a glaring difference, which imparts an altogether special character to the possessions of these two powers in this part of the world.

After Russia had freed herself from the Tartar yoke and had established order within her borders, her Tzars naturally and freely spread out on all sides along the face of the vastest plain in the whole of the old world, in some directions even reaching right up to their natural boundaries, while in others they held their ground by means of temporary posts erected along their historical lines of advance.

This vigorous growth of the kingdom is like the natural growth of a healthy tree, which freely throws out its gigantic branches on all sides, sucking up nourishment from the deep strong roots. The favourable geographical conditions conjoined, as we shall see presently, with the fundamental character of the natural size of Russia within its own borders led to the creation of a vast compact nation, in which the shell and the kernel were united as firmly and organically as the branches and the trunk of one tree.

Under very different conditions were the English possessions in Asia acquired. Thither in the 16th and 17th centuries Englishmen had bent their steps, in the wake of other nations, impelled by a spirit of enterprise, which at that time had seized on many of the peoples of Western Europe and driven them to maritime exploration. Under the influence of a favourable concatenation of circumstances, the first-born colony of the English in India expanded into a powerful kingdom, which now appears as a separate empire, linked to the kingdom of England. Notwithstanding the brilliant successes, however, achieved in India in regard to its economical development and its civil condition, the colony has remained to this day an excrescence on the mother-country, and not united with it by any living arteries, but foreign in all respects.

Undoubtedly the mere fact of the creation by insignificant means of the vast Indian Empire with a population of more than 300 millions is in itself the most brilliant example of the innate enterprise of Englishmen and the existence in them of indomitable energy, combined with a self-reliance which nothing can stay. But the thirst for gain as a fundamental impulse, impelling the English to seek after riches in India at the present time, appears to be the sole link between England and its colony.

Herein lies the vast difference between the Russian and English possessions in Asia.

To deprive England, for instance, of India would be to deprive the English of their most important market for the sale of their productions; but to deprive Russia of either the whole or a part of Siberia, for instance, would be to cut off a part of her own self.

This is why it appears to us perfectly natural if our provinces sometimes absorb more than they return to the Government. It is in reality the ordinary circulation of the blood in the same living organism.

## II.

Already during the independent historical life of Great Novgorod the Russians were irresistibly flowing into Asia under the influence of many and varied conditions, social, geographical, and others, which we cannot go into here. In course of time this original movement established itself along two lines, along which to this day our advanced posts are still in existence, to wit: in the east towards the Pacific and in the south towards Central Asia. Along the eastern line Russia has already reached the limit of her advance and is now firmly established on the shore of the Pacific; along the second line Russia is at present halting at temporary stages, not having yet reached any natural boundaries, which, as we shall see presently, must inevitably serve as the goal for her further lawful movement forward.

At all these advanced posts Russia has come in contact with, if not the immediate possessions of England, at all events her furthest extended sphere of influence. Thus, between these two Governments has arisen on the continent of Asia two main theatres of rivalry: in the Far East and Central Asia. In conformity with this I will endeavour to explain the mutual positions of these two nations in these theatres of action; but for this it is necessary to follow, however shortly, the routes by which Russia and England have advanced until they have met in Asia.

## III.

The first recognised movement of Russia eastwards in the Asiatic direction began before the conquest of Siberia after the incorporation of Perm in the Government of Moscow.

In the defence of the interests of the people of Perm against their troublesome neighbours on the side of the Urals, the Grand Duke of Moscow, Ivan III, undertook the first expedition into Asia in 1499 with a small detachment of 402 men under the command of Dukes Simon of Kint and Peter of Ushat.

Concerning this first step of Russia on to the continent of Asia we find the following short account in the "Moscow Annals of the Steppe": "In the summer of 1499 Grand Duke Ivan, having sent his army into the land of Ugor and Vogulich and having taken their cities and conquered their country, captured their princes and brought them to Moscow. The remainder of the inhabitants of Ugor and Vogulich were killed or brought captive to the Grand Duke."



The influence of Russia after this first success rapidly spread towards the east, so that in 1554 and 1556 in the Tzar's title he is called "Sovereign of all the northern shores of Obdor, Koudin, and many other lands," and in another document of that time to the Tzar's title is added "of all the Siberian country and of the northern lands, Ruler." In a word, fifty years after that first step beyond the Urals Russia considered herself master from the River Ob eastwards; this is indeed practically confirmed by the fact that in 1574 the Strogonofs were even then petitioning to be given land in Tobol, *i.e.*, land lying undoubtedly within the boundaries of Siberia proper.

Shortly before this Maxim Strogonof had suggested to one of the Atamans of the free people, Yermak Timofeyef of Povolsk that they should attack the Tartar Duke Kuchum. This further advance into Asia was not well received in Moscow, and Strogonof, as is mentioned in the Remez Annals, received from the Povolsk Government the following reprimand: "Peasant, beware of coming into conflict with such a great and powerful neighbour." It was, however, too late to stop what was already commenced, and when in 1582 the emissary of Yermak, Ivan Kaltzo, arrived in Moscow to pay his respects to the Tzar of Siberia, he was forgiven by the Embassy office and his gifts were accepted, and in return many presents and rewards were sent to Yermak.

This first protest against the onward advance of Russia on the continent of Asia is for us in the highest degree edifying, despite the insignificance of the fact itself. "What will Kuchum, the Tartar Duke, say" as later "what will Europe say, what will England say," appears as we shall see to be a fatal drag on the historical growth of our country. Frequently has Russia been on the point of solving her most difficult problems by the help of her brave sons; after crossing waterless steppes and lofty mountains, after vanquishing a determined foe, all her hopes and victories have been suddenly rendered of no account by foreign, cunningly devised interference.

To say nothing of more important historical movements, it is sufficient to recall our last boundary demarcations in Asia.

The conquest of the Siberian Tzardom gave a powerful impetus to a further advance towards the East. Not more than 100 years after the first reconnaissance of Yermak the Russians had already reached the Pacific Ocean; for in 1697 Altasof with 120 Cossacks penetrated from Ayadyr Fort to Kamchatka, which was then occupied permanently by a detachment sent from Yakutsk.

Thus was accomplished the progressive advance of Russia eastwards towards the Pacific, which was completed, as we have seen, at the end of the 17th century.

Our further work on the continent of Asia during the 18th and first-half of the 19th centuries was confined to strengthening our position in the newly acquired territory and the introduction into it of Russian civilisation.

#### IV.

Almost simultaneously with the progressive advance of Russia across Siberia to the Pacific Ocean other historical reconnaissances

were being carried out in another direction, *vis.*, on the side of Central Asia. Here the Cossacks acted as the antennæ so to speak of the Government, for they had already in the 17th century made incursions into Khiva, of which we are told by the Khivan historian, Abdul Ghazi Khan.

From the time of Peter the Great the advance of Russia into Central Asia ceases to be an elementary one, and it is now carried out in two directions, *vis.*, along the Amu Darya and along the Irtysh.

These movements were due to the need for guarding Russia's possessions on this side from the pillaging forays of the half civilised nomads of the Central Asian steppes. By the side of this main aim of defence Peter the Great likewise authorised Duke Bekovich in 1714 to explore the main roads leading from the Caspian towards India. From this commission arose the belief in England and among our other well-wishers in Western Europe in the bugbear of a will of Peter the Great, bequeathing to this country the conquest of India; just as likewise arose in Western Europe the conviction in the other mythical will of Peter: the conquest of Constantinople.

It will suffice us here to glance at the map of Asia to be convinced that, by reason of unavoidable conditions, it was absolutely impossible for Russia to stay where she was at that time.

Having occupied and built two lines of forts, *vis.*, the Orenburg and the Siberian, we had left enormous doors wide open through which Kirghiz, Turkomans, and Khivans could penetrate at any time. Notwithstanding this, however, so great was our aversion to plunge into the depths of Asia that we remained stationary for more than 100 years along these two lines.

During the second-half of the present century, however, having established our position at the extremity of the continent by the absorption of the Amur country, and the vast Pacific coast, after a long halt on the Orenburg and Siberian lines at length we moved forward into Central Asia.

This second and final period of our advance into Central Asia, which we are at the present moment living in, independently of the considerations involved by the necessity of finding firm abutments for the erection of our frontier, conceals in the first phase of its development the necessity of a diversion in the direction of India. This necessity arose in the time of the Emperor Paul I, but it was not till the Crimean war of 1854-56 that it was thoroughly recognised as within the sphere of practical politics.

This second period of our progressive advance into Central Asia dates from 1864, when Tokmak, Merke, Turkistan, and other towns forming together the New-Kokand line were taken.

Our further advance into Central Asia was accomplished without a halt and was terminated by the delimitation of the boundaries in 1888 and 1895, on both of which occasions we had come into contact with the Afghan possessions, behind which is immediately concealed the influence of England, our immemorial rival.

Thus we had reached that Achilles' heel of our perpetual adversary, to reach which Napoleon and Paul I had so vainly striven.

The general movement of Russia on the Asiatic continent may be thus summarised.

Starting in a broad wave which rushed with an irresistible flow eastwards to the Pacific Ocean, after striking the northern end of the Pacific shore, *viz.*, the Anadyr island, it was deflected south from Anadyr to Kamchatka, thence to Okhotsk, to Nikolaievsk, to Vladivostok, and finally as we have recently witnessed to Port Arthur.

In Central Asia, as we have just seen, Russia has on a broad front come into contact with Afghanistan, behind which stands England, Russia's foremost enemy. At the same time both these powers have also come in contact in another part of Asia, *viz.*, in Persia, which is surrounded on two sides by Russian possessions, while on the third side it adjoins the possessions of British India.

## V.

Let us now take a cursory glance at the historical course of the progressive advance of England on the Asiatic continent.

The first spot that attracted the English to Asia was India, where in 1615 their first trading factory was founded in Surat on the river Tapti by the British East India Company. Up to the time of the appearance of the English in India the whole of the trade of Europe with that country was carried on through the medium of the Dutch, who, however, never established themselves on the Indian peninsular, but owned factories on the Molucca and Sunday islands. The competition of the English produced a collision between them and the Dutch, which resulted in the extermination of the former on the island of Amboyna in 1623. After being thus worsted in their encounter with the Hollanders, the English betook themselves to the peninsular of Hindustan, where they thought themselves free of European competition, but in this they deceived themselves, for the Portuguese are justly entitled to claim precedence in India, having discovered the sea route thither in 1498. The meeting of the English and Portuguese resulted in a sea fight near Surat. The English remained victors and at the same time undisputed masters in Hindustan. This dispute aided in a remarkable manner the spread of the power of the English over the Indian peninsular. The natives had for long been accustomed to frequent changes in their foreign rulers, to whom the fabled wealth and tropical climate of India had always offered irresistible attractions. The weak, untrustworthy rulers of the small native states carried on amongst themselves perpetual quarrels, willingly appealing for help to any and every foreigner they could.

Such were the conditions in the peninsular when the first English factory was founded in Surat, and this was soon followed by the establishment of many other trading depôts on both sides of the peninsular.

For the defence of these factories was required before all else a stronghold in case of a sudden attack from the natives; consequently, as in the case of our first Siberian stockades, arose the Fort of St. George, the first English stronghold in India, which now forms part of the town of Madras. This was also the first piece of Indian territory acquired by the English in India.

The new possessions belonged, however, not to the Government but to a special company of merchants, which started operations on a capital of no more than £ 70,000 sterling.

Taking advantage of the difficulties of the Government in 1698, the East India Company acquired for itself the monopoly of trading on all the shores of the old world from the Cape of Good Hope to the Straits of Magellan, and most important of all—the right to govern all the territory possessed by the Company in India. These important monopolies were acquired by the Company for a sum of £ 3,200,000.

In the wake of the English factories were also founded by the French, Germans, Danes, Austrians, and Swedes, but, with the exception of the French, none of them were able to compete with the English.

Up to the middle of the 18th century, *i.e.*, for more than fifty years, the East India Company was entirely absorbed in trade, and gave no thought to conquest. At this time, however, the Mogul Empire, which was the last remnant of the majesty of India, fell to pieces; their successors, petty potentates, each ruling but a small state, waged incessant wars with each other, and drew into their quarrels the French Governors of Pondicherry, Dumas, and Dupleix, who thus acquired a commanding position throughout the whole peninsular.

The successes of the French, and the destruction of the Anglo-native Fort William (which now forms part of the town of Calcutta) by the Nawab of Bengal roused the Directors of the Company out of their passivity. Thanks to the energy and skill displayed by the young Lieutenant Clive a small English detachment occupied Calcutta and Chandanagore, defeated the forces of the Nawab, and replaced the latter by another ruler, who agreed to pay the Company a tribute of 10 million rupees.

At the same time the East India Company acquired large possessions in Bengal with the right to collect all revenues and taxes from the population.

Colonel Clive was installed as the first Governor of Bengal. He still continued to wage successful war with the natives and the French, whose influence in India diminished greatly after the capitulation of Pondicherry in 1761.

Twelve years later, *vis.*, in 1773, the English Parliament passed the so-called "Regulating Act," by which the title of Governor-General was bestowed on the Governor of Bengal, and all the projects of the Company in regard to the organisation of their institutions, ships, and troops throughout their possessions in India were formally sanctioned.

The first Governor-General of India was Warren Hastings, who is reckoned the organiser and founder of the internal affairs of India, as Clive is looked upon as its conqueror.

At the same time it also fell to Hastings' lot to carry on incessant wars with the Mahrattas and other tribes; these wars usually ended in the collection of large tributes from the native rulers on behalf of the Company.

This system of extortion produced a burst of indignation in England; so that on the return of Warren Hastings from India he was arraigned before the High Court of Parliament and only after a trial extending over many years was he acquitted.

The successor of Hastings, Marquis Wellesley, early propounded the principle that England should be sole ruler in India, and accordingly waged ceaseless warfare with the remains of the French power in India.

The favourable termination of the long series of wars waged by England against Napoleon I finally established the position of the English in India, from which the French were driven out, including even those who were instructors in the native armies.

At the present day the sole possessions of the French in India are small colonies on the Coromandel and Malabar Coasts, about 24 square miles in area, with a total population of 283,000 people.

In 1823 the East India Company was led into a war with Burma, which lasted three years and ended in a further extension of the English possessions by the acquisition of Assam, Aracan, and Tenasserim.

Then in 1836 arose war with Afghanistan, or, to speak more exactly, it was a war against the first cloudy phantom appearing in Central Asia of a Russian invasion of India.

The immediate cause of this war with Afghanistan was the welcome given by Dost Mahomed Khan to a Russian mission. Besides this, however, the East India Company were not overpleased with Dost Mahomed's pretensions to the annexation of the Punjab. These were based on the fact that this rich and vast district, two-thirds of the population of which were of Afghan descent, had been conquered by the Afghan Amir, Ahmed Shah Durani, who, in the middle of the 18th century, had founded a gigantic Afghan kingdom, in which was incorporated, besides the Punjab, the whole of Northern India, which was also full of descendants of Afghan blood.

The war with Afghanistan lasted five years, and from the point of view of the Afghans ended in the defeat and expulsion of the English from Kabul and the replacement on the Afghan throne of Dost Mahomed, who had been languishing in prison. The English troops during this war suffered two disasters during their celebrated retreat through the Khurd-Kabul and Jagdallak defiles, where the English detachment was annihilated almost to a man by the pursuing Afghans.

In its results this bloody and costly war not only brought no advantage to the English, but did not even cause Dost Mahomed to abandon his lawful claims on the Punjab, and only three or four years after the conclusion of the war Dost Mahomed brought about a rising of the Sikhs in the Punjab, whom he openly befriended against the English.

After quelling the rising of the Sikhs the English annexed the Punjab in 1848. Shortly after the annexation of the Punjab the English Empire in India almost tottered to its foundations in consequence of a mutiny of the sepoys, *i.e.*, of the enlisted native troops in the service of the East India Company. This mutiny forms the most

important epoch in the life of British India, for it ended in the abolition of the Company and the taking over by the English Royal Government of the administration of India; since that time the Governor-General of India is unofficially known as the Viceroy.

The growth of the English possessions in the peninsular continued without interruption, and ended in the annexation of Burmah in 1886, and the placing of English garrisons in Kashmir, Gilgit, and Chitral, so that at the present moment British India directly touches Afghanistan, Thibet, and Siam.

It should further be added that under the influence of many and various circumstances British India, formed into an empire in 1878, is surrounded by a broad zone of semi-independent countries, which in the matter of its defence serve, so to speak, as springs for a number of buffer states, which are to cover India from blows from the direction of Central Asia.

The formation of this so-called "scientific frontier" was devised by Lord Beaconsfield in 1879 after the second Afghan war and was formally proclaimed in 1894; in which year Sir Mortimer Durand concluded a treaty with Abdur Rahman Khan, under the terms of which the Afghan Amir relinquished all claims to the country lying along the banks of the rivers Zhob, Gomal, Tochi, and others.

Thus, in addition to the existing old or administrative frontier, was formed a new or Durand frontier, marking the limit of the political sphere of the British India Government.

I would ask you: is it possible for the Amir to honestly resign all claim to these lands, which are almost entirely inhabited by men of the same blood and the same faith as the Afghans themselves? The best answer to this question may be found in the late risings on the North-West Frontier of India. These men, unwilling to allow English authority to be exercised on their territory, still continue as of old to look to Kabul for help.

However it may be, one thing is clear, that all this buffer zone can only serve as a hatching ground for endless risings in the future.

The more important of the remaining British possessions in Asia have primarily a strategic purpose, and serve to keep open the line of communications between England and India and the possessions on the Pacific Ocean; the chief of these are Perim, Singapore, Hong-Kong, and the lately acquired Wei-hai-wei.

Furthermore the sphere of English influence has stretched on the one side across Seistan and on the other side along the valley of the Yang-tsi-kiang right up to Shanghai, *i.e.*, to the shores of the Pacific Ocean, and the English are striving with all their might to unite their possessions in Asia from sea to sea just as after their late victories in the Soudan they have already almost achieved a similar end in Africa, *vis.*, the union of their possessions from the Cape to the Mediterranean.

With such a vast extension on the continent of Asia of the Russian possessions on the one side and of the English possessions on the other a collision between these two powers has apparently become inevitable.

Having thus shortly explained the historical advance of Russia and England in Asia, let us now turn our attention to the latest events, which are still being enacted on the stage of rivalry between these two powers.

And first of all we will consider the mutual relations of Russia and England in the Far East.

## VI.

Here the mutual relations between Russia and England have chiefly during the last five years grown acuter, *i.e.*, since the China-Japan war, although causes for a probable collision between the two Governments arose long before that time, for they have their origin in the appearance of Russia on the shores of the Pacific Ocean.

During the Crimean war, for instance, the English endeavoured to destroy Petropavlovsk and vainly searched in those waters for our small squadron of three frigates. As our economical position in the Far East gradually improved by the conversion of Vladivostok into a fortified place, and as our Pacific squadron increased in strength, the more vehement and open became the hostility of the English to any further consolidation on the part of Russia along the shores of the Pacific Ocean. At length the occupation by us of Port Arthur in 1897 and the approach thither of the gradually finishing Siberian railway gave Russia the possibility of appearing in strength on the chief scene of action in the Far East: this, however, made our relations with England so acute that a rupture with her in that part of the world became probable at any time.\*

How closely allied is this probability with the occupation by us of Port Arthur I can personally vouch for, as I was in England and America at the very time when the first information was received in those countries concerning the intended occupation; not only the English press but likewise the American was so disturbed at the news that there on the spot it looked as if we should be at war not only with England, but even also with the United States.

All this paper excitement, however, soon ceased, and now it is quite the reverse: both in the English press and in Government circles a strong re-action has set in, strongly in favour of a mutual agreement. This peaceful disposition manifested itself as is well known in the affairs of the Far East, where a *modus vivendi* was very soon found in accordance with which the spheres of influence of both Russia and England in China were settled.

Contenting myself with this cursory sketch of the position of Russia and England in the Far East, I will now give a short account of the position of these two powers in Central Asia.

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\* The agreement not long ago concluded between Russia and England regarding questions relating chiefly to the Far East has removed any causes for disagreement in the very near future and has generally tended to smooth over matters likely to lead to mutual misunderstandings, but no one can prophesy how long this agreement will last,—once the interests of either Russia or England are threatened by the other in China; interests which will undoubtedly be vital, and are far from always being mutual.

Since the interests of Russia and England first came into question in this part of the world, *i.e.*, since the time of the first Afghan war, the conditions in this possible theatre of rivalry have changed beyond all recognition, and absolutely and entirely in our favour. Without going far back it is sufficient to consider the enormous change that has taken place in this possible field of operations during the last two decades: the vast waterless desert, which then separated Turkestan from its nearest base—the Caucasus, is now crossed by the railway; the lately opened Murghab branch enables us to concentrate our forces from 3—4 marches from Herat which is still considered the key of India; and, lastly our occupation of the Pamirs has withdrawn a respectable portion of the troops and the attention of the Indian Government from the main front, the north-west frontier; or, in other words, has led to the splitting up of the defensive forces of the English in Central Asia; and this result has been accomplished by us with the comparatively insignificant forces, which are maintained by us on the Pamirs.

The importance of the Pamir sphere will be especially clear to us if we consider the last frontier rising in India.

To the present moment the English are loath to acknowledge categorically the real reason, which led to a general rising of the frontier tribes, which cost the Indian Government such considerable sacrifices and losses; all the same everyone not only in England but also in India knows that one of the main and principal reasons was the occupation by the English troops of Chitral and the Swat valley. In order to make clear the reason for the occupation of these places by English detachments, it is necessary to glance for a moment at the history of our occupation of the Pamirs.

In her progressive advance into Central Asia Russia as is well known, made her last forward step in 1876, by the conquest of the Khanship of Kokand, which brought us up to the Alai valley, *i.e.*, to the present boundary of the Pamir country. A long uninterrupted succession of expeditions, which had widely dispersed our territories in Central Asia, necessitated the strengthening of the previously acquired territory by some means or other. Hence, as soon as it appeared possible to at last call a halt, the first matter which claimed attention was the establishment of civil rights and civil jurisdiction in the lately acquired territories. There was no time then certainly to take up the many frontier questions which we had inherited from our predecessors. Thus, for instance, we kept on postponing the Pamir question, which we had inherited along with the Khanship of Kokand. In this particular case, moreover, our course of action was perfectly excusable for the Alai and trans-Alai, formed a secure bulwark for our new possessions from the south, and the Pamir Khanships of Wakhan, Shignan, and Roshan were to us an absolute *terra incognita*.

That shortly put is the reason why the Pamirs at first received no attention from us.

This circumstance did not pass unnoticed by the Indian Government, and the latter suggested to the Afghan Amir the possibility of uniting to Afghanistan the Pamir Khanships, wishing thereby to



distract his attention from the tribes inhabiting the north-west frontier of India, on which Afghan Amirs had always looked with covetous eyes.

The advice of the English was followed, and under the pretext of punishing the Shignan ruler, Said Akbar Shah, the Afghans, despite the protests of the Russians, raided on to the Pamirs. Thus arose the "Pamir question," which in its day resounded throughout the whole world, and it was only finally settled by the delimitation commission in 1895 and the cantoning there of our small advanced detachment.

This latter circumstance compelled the Indian Government to establish an advanced post at Chitral, and, in order to safeguard the communications with this post, it was found necessary to build a fort at Chakdara and to quarter on the Malakand pass in the Swat valley a special Malakand Brigade, and this notwithstanding the sacred promise made to the Swat tribes that an English garrison should be placed only at Chitral.

This breach of faith led to the last frontier rising which cost the Government of India more than 2,000 in killed and wounded, and about 270 million rupees; furthermore the existing calm in the Swat valley can in no way be considered of long duration, as the chief cause of the rising, *vis.*, the presence of English troops at the Malakand and Chakdara is still existing.

In fact, not longer ago than February of the present year, a new conflagration flared up, which gives signs of not having been yet extinguished by the constant small splutterings which still take place at various spots along the north-west frontier.

We see then that an insignificant spot in our possessions, which became choked up somewhere in the garret of Central Asian possessions directly caused all this bother to the Government of India.

And such, properly speaking, is the secret significance of our Central Asian border, which hangs like a sword of Damocles over India, the most vulnerable spot of our perpetual adversary.

But, in order that Turkestan may serve as the *momentum mori* for England, we must increase here our offensive forces, and for that before all else it is necessary to link our territory by the shortest railway line with the heart of Russia. Only then, when Russia herself draws near to India, will it be possible to arrive at a peaceful settlement of all the questions which from time to time render acute the mutual relations of Russia and England on the continent of Asia. Then all those so-called strategic railways, which are either at present in existence or are contemplated, whether Russian or Anglo-Indian, as well as all the rest of the armament for mutual strife and rivalry of these two powers in Asia, will be joined in friendly rivalry on behalf not only of the Governments themselves, but also of the natives under their respective rule in this vast portion of the old world.

And we firmly believe that this time is not now far distant.

## NOTICE.

The sum of Rs. 500, allotted by the Council of the U. S. Institution of India as premia for articles contributed to the Journal during 1899 was distributed between the undermentioned officers :—

Colonel E. G. BARROW, C.B., Deputy Secretary, Military Department.

Colonel H. H. HART, R.E.

Lieutenant-Colonel F. M. RUNDALL, D.S.O.,  
1-4th Gurkha Rifles.

Lieutenant-Colonel H. M. SINCLAIR, R.E.

Major A. KEENE, D.S.O., R.A.

„ S. S. LONG, D. A. A. General.

An Army Surgeon.

Captain R. W. FALCON, 4th Sikhs.

„ E. PEACH, 3rd Madras Infantry.

„ R. G. BURTON, 1st Infantry, H. C.

„ H. F. THUILLIER, R.E.

The following Essays have been received for the Gold Medal Competition for 1900 :—

1. Vincit Amor Patriæ.
2. Deus dexter meus.
3. Le Mieux est l'ennemi du Bien.
4. Noarlunga.
5. Parturiunt Montes.

## Prize Essay Gold Medallists.

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- 1872.....ROBERTS, Lieut.-Col. F. S., V.C., C.B., R.A.  
 1873.....COLQUHOUN, Capt. J. A. S., R.A.  
 1874.....COLQUHOUN, Capt. J. A. S., R.A.  
 1879.....ST. JOHN, Maj. O. B. C., R.E.  
 1880.....BARROW, Lieut. E. G., S.C.  
 1882.....MASON, Lieut. A. H., R.E.  
 1883.....COLLEN, Maj. E. H. H., S.C.  
 1884.....BARROW, Capt. E. G., S.C.  
 1887.....YATE, Lieut. A. C., S.C.  
 1888.....MAUDE, Capt. F. N., R.E.  
               YOUNG, Maj. G. F., S.C. (specially awarded a silver medal)  
 1889.....DUFF, Capt. B., S.C.  
 1890.....MAGUIRE, Capt. C. M., S.C.  
 1891.....CARDEW, Lieut. F. G., S.C.  
 1893.....BULLOCK, Maj. G. M., Devon. Regt.  
 1894.....CARTER, Capt. F. C., Northumberland Fusiliers.  
 1895.....NEVILLE, Lieut.-Col. J. P. C., S.C.  
 1896.....BINGLEY, Capt. A. H., S.C.  
 1897.....NAPIER, Capt. G. S. F., 2nd Bn. Oxfordshire Light Infantry.  
 1898.....MULLALY, Maj. H., R.E.  
               CLAY, Capt. C. H., S.C. (specially awarded a silver medal).  
 1899.....NEVILLE, Col. J. P. C., S.C.
- 

## MacGregor Memorial Silver Medallists.

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- 1889.....BELL, Col. M. S., V.C., R.E. (specially awarded a gold medal).  
 1890.....YOUNGHUSBAND, Capt. F. E., K. Dn. Gds.  
 1891.....SAWYER, Maj. H. A., S.C.  
 1891.....RAMZAN KHAN, Havildar, 3rd Sikhs.  
 1892.....VAUGHAN, Capt. H. B., S.C.  
 1892.....JAGGAT SINGH, Havildar, 19th P. I.  
 1893.....BOWER, Capt. H., S.C. (specially awarded a gold medal)  
 1893.....FAZALDAD KHAN, Dafadar, 17th B. C.  
 1894.....O'SULLIVAN, Maj. G. H. W., R.E.  
 1894.....MULL SINGH, Sowar, 6th B. C.  
 1895.....DAVIES, Capt., Oxfordshire Light Infantry.  
 1895.....GUNGA DYAL SINGH, Havildar, 2nd B. I.  
 1896.....COCKERILL, Lieut. G. K., 28th P. I.  
 1896.....GHULAM NABI, Private, Q. O. Corps of Guides.  
 1897.....SWAYNE, Capt. E. J. E., 16th B. I.  
 1897.....SHAHZAD MIR, Dafadar, 11th B. L.  
 1898.....WALKER, Capt. H. B., Duke of Cornwall's Light Infantry.  
 1898.....ADAM KHAN, Havildar, Guides Infantry.  
 1899.....DOUGLAS, Capt. J. A., 2nd Bengal Lancers.  
 1899.....MIHR DIN, Naik, Bengal S. and M.

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### THE USE OF LIGHT RAILWAYS (2 FT. 6 IN. GAUGE) IN INDIAN WARFARE, AND THE ORGANIZATION AND WORKING OF RAILWAY CORPS.

BY CAPTAIN H. F. THULLIER, R.E.

*Motto* : "Vincit amor patriæ."

The importance of field railways in warfare is fully recognized in all the principal European armies, and it should not be necessary to bring forward any arguments to prove it. In India, however, this principle has apparently not been accepted, as, so far, no efforts have been made to provide the Indian Army with an organization which is elsewhere considered an adjunct of the first necessity. From this one would be led to conclude that the conditions of Indian warfare, or the theatre of Indian campaigns, differed from those of Europe in such a way as to render the employment of field railways either impossible or unnecessary. An examination, however, of the circumstances under which Indian and European armies are called upon to fight does not bear out this conclusion. The omission in fact appears to be merely an example of the backwardness of the Indian administration, compared with that of other countries, in availing itself of the resources of science for the furtherance of military operations.

The problem which it is proposed to discuss in this paper is that of the construction in war time of light field railways to follow the troops, as far as possible, along the lines of communication; and the question taken up will be: whether it is desirable to introduce such a system in India; to what extent and under what conditions field lines could be constructed during the course of a campaign; and what organization and method of working would be most suitable.

#### THE DESIRABILITY OF EMPLOYING LIGHT RAILWAYS IN INDIAN CAMPAIGNS.

In European countries the possible theatre of war is generally covered by a net-work of permanent railways, in the location of many of which strategical considerations have borne a considerable part

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also the intermediate country is well provided with good roads. When therefore it becomes necessary for the armies to leave the lines of rail, wagons and carts can be employed in carrying supplies. Notwithstanding these advantages, the great continental Powers have considered it necessary to organize a system by which light lines of railway may be laid actually during the progress of a campaign, to connect the armies with the permanent lines. To this end they have formed special corps of railway troops, equipped with all the necessary plant and stock, and they pay an immense amount of attention to the training of these troops for the duties they would have to perform in war.

It is worth while considering for a moment the conditions of European and Indian warfare in order to see if there is anything in the latter which render a similar organization unnecessary or impossible of execution. Firstly, it may be argued that the number of troops employed in Indian campaigns is so small compared with the enormous masses set in motion in European wars, and consequently that the quantity of stores to be carried is so much less, that it is unnecessary to arrange for so elaborate a mode of conveyance as specially constructed field railways. This, however, is not the case. Indian campaigns take place at much greater distances away from railways than European ones, and the proportion of stores required to follow Indian armies into the field is greater than in European wars. The latter are waged in fertile countries where a considerable amount of food supplies and forage can be obtained; also villages and towns exist in which troops can be billeted. Indian campaigns, on the other hand, are fought in barren hills and rocky inhospitable valleys, which afford practically no supplies for man or beast. All food, grain, and fodder for the entire force has therefore to be conveyed from India, and, as billeting is impossible, tents have to be taken also.

Were it possible to argue that the road communications in the theatres of Indian wars were so good, and India's resources in the matter of transport animals so ample, that all possible requirements could be readily met, it might form an excuse for adhering to the existing arrangements rather than incurring the initial expense of the provision and organization of a field railway system. The exact contrary, however, is the case. It is unnecessary to describe the nature of the country beyond the frontiers of India; it is sufficient to say that communications, except those made by our armies, are non-existent. It is notorious that the supplies of transport animals and drivers in the campaigns of 1895 and 1897 were insufficient in numbers and inferior in quality, and that in the event of a great war, in which the full resources of India would be called forth, the existing transport system would be hopelessly inadequate.

The transport employed in Indian frontier wars consist chiefly of bullock carts, camels, and mules, though sometimes donkeys, ponies, and pack bullocks are employed. Carts can only be employed when roads exist or

Comparison of Indian with European conditions.

Inadequacy of present transport arrangements.

Insufficiency of animals.

are made during the course of the campaign. Camels, though they do not of necessity require roads, cannot, without breaking down, carry loads continuously over steep gradients; therefore in the mountainous country beyond the frontier there are many places where camels cannot be employed until roads have been made. Mules are the great stand-by in the rocky hill tracks which are the only communications in that region.

The supply of all these forms of transport, even for the comparatively speaking minor campaigns of the past few years, has been undeniably short of the demand. The present system of obtaining it consists in purchasing or hiring the animals at the outbreak of each campaign. Notwithstanding the efforts Government have made to improve the supply, it is only with the utmost difficulty that the requisite numbers are obtained when wanted. In fact, it is only by having resource on a large scale to what is virtually impressment that they are obtained at all. The injury and suffering caused to the rural population by forcible taking away their animals, particularly in the case of bullocks which are required for agricultural purposes, is very great. Often, in cases where animals are hired, the owners, who cannot go with them, do not see them again; and claims for compensation are difficult to prove. Even when they are bought outright, the price paid cannot possibly compensate the owner for being obliged to leave his fields unploughed or his harvests ungarnered. It is also an unavoidable result of such a system that many of the animals thus obtained are wretched weakly creatures, unfitted for the hard work they are called upon to do, and that numbers of them succumb after a short time.

The system of impressment, moreover, is not confined to animals, but extends to men in the capacity of drivers. This brings us to another serious defect in the present system. It is a

Insufficiency of drivers.

popular fallacy that a camel can be knocked about for days together with little to eat and no water; actually, however, to keep them in condition and in their full working powers considerable attention and care are necessary. For this it is essential to have proper *surwans*, men who are accustomed to the handling and treatment of camels from youth up. Similarly for mules reliable men of good physique are wanted to properly load and lead them. Unfortunately it seems impossible to obtain either, and in consequence crowds of ignorant, wretched coolies are impressed as camel and mule drivers, and sent up to the front, the result being that the animals are ill-treated and ill-tended, and that on the march the utmost confusion often prevails. The unfortunate men, too, die by hundreds from exposure. The serious evils that arise from this condition of affairs have been brought to light over and over again in the frontier campaigns of late years and are dwelt on at length by Colonel J. P. C. Neville in the Gold Medal Prize Essay of last year.

So great in fact is the inadequacy of our present organization, and so far reaching the evils to which it gives rise, that its improvement and reform is a matter of vital importance. The question

Desirability of substituting railways.

is whether this reform should take the form of improving the supply

of animals and men, or whether it should be recognized that our resources in that direction are limited, and that field railways should be employed wherever possible on lines of communication, in order to reduce the number of animals required. Now Government have for years past been endeavouring to improve the supply of transport animals, and it must be admitted that their efforts have not been successful in producing the requisite numbers. It is hoped in the following pages to shew that the other alternative, namely, that of employing light lines of rail, is feasible, and that it would result in greatly reducing the strain on our transport system which now arises whenever it becomes necessary to put a large force in the field.

There is, moreover, another most potent reason for adopting the latter course. In many, in fact most,

**Saving in fodder.**

of the theatres of war beyond the frontier, fodder for animals cannot be obtained except in small quantities. In these cases all fodder for the transport animals themselves has to be carried up from the base. Now a mule can carry only eight days and a camel only twenty days' supply of its own fodder ration. The number of marches which any force can go beyond the furthest supply depôt is absolutely restricted by this fact. For instance, if a force has to go but four marches from a supply depôt, and no fodder is procurable for transport animals on these marches, half of every mule's load would consist of its own fodder; or, in other words, double the amount of transport would be necessary to move the force. The result of this is that every three or four marches supply depôts have to be formed and stocked before an onward movement can be made. Great delay results in all frontier campaigns from this cause alone, and any organization that will avoid this by reducing the number of transport animals required will be of enormous benefit.

#### EXAMPLES OF TEMPORARY RAILWAY CONSTRUCTION IN PAST WARS AND THE ORGANIZATION ADOPTED BY CONTINENTAL ARMIES.

Before proceeding to the discussion in detail of the problem of how to organize a suitable system for Indian requirements, it will be of advantage to note to what extent temporary railways have been constructed in war by British and foreign armies in various parts of the world, and to avail ourselves of the experience gained on these occasions. It will likewise be useful to examine the systems which have been adopted by the great European military powers, who, as their national existence practically depends on the efficiency of their military services, have not failed to take up, with the utmost attention to details, the question of field railways and to provide themselves with whatever organization their experience shews them to be best suited to their requirements.

The continental wars afford but few examples of railway work in war,

**Continental wars.**

and these are not of a nature to be of much assistance to us. In 1870 the small amount of railway work done by the Germans consisted in making short connections on the broad gauge lines, and they took a long time to carry them out. They had no organization for light temporary lines.

In the American Civil War railway work filled an important part.

**American war.**

It consisted, however, almost entirely of repairing the existing lines after they had been damaged by the other side, and of short connections on the same gauge. The nature of the work and the resources of the country were so different from what we should have to face on the Indian border that their example will not materially assist us in selecting a system for our requirements.

To turn to the operations of British forces in foreign lands, the

**Abyssinian war.**

first example we get of railway construction in war time is in the Abyssinian Expedition. During this campaign a temporary line, 10½ miles long, was constructed by military labour from Annesley Bay to the first camp at Koomaylee. The work was performed by men of the 23rd Punjab Pioneers and the 2nd Bombay Grenadiers under the superintendence of Royal Engineer officers. Eight iron girder bridges had to be constructed, and in some parts there was a considerable amount of cutting and embankment. The work took long in completion owing to the absence of proper organization and of previous training of the troops employed on it, and also to the unsuitable nature of the plant supplied. The Commanding Royal Engineer reported that no less than five different patterns of rails with four different methods of fixing had been provided; in some of these the holes in the fish-plates differed from those in the rails and the bolts would not go through. The lessons to be derived are obvious.

In the various campaigns in Egypt and the Soudan a good deal of

**Egypt and the Soudan.**

railway work has been done. In the suppression of Arabi's revolt in 1882 the work consisted in the repair and management of the existing line from Ismailiah to Kassassin and not in any new construction. In the Nile Expedition of 1884 the Soudan Railway from Halfa to Sarras was maintained and managed by the Royal Engineers, and it was subsequently extended for a distance of 50 miles from Sarras to Akasheh. Great difficulties were met with in the construction of this connection. Labour being scarce, large detachments of Egyptian infantry were employed and 300 Indian plate-layers were imported from Bombay. Plant and materials could not be procured with sufficient rapidity from England, and a good deal of it had to be brought from Cape Colony, as the gauge (3 ft. 6 in.) was the same as that of South African lines. About half a mile a day was the rate of progress attained, and the line was not completed until the British troops were about to quit the Soudan.

In the beginning of 1885, after the fall of Khartoum, a railway was commenced from Suakim to Berber. The arrangements made for this afford a striking example of how not to do it. The plant, materials, and rolling-stock were to be supplied, and the railway constructed, by a firm of English contractors, to whom such assistance as the exigencies of the service permitted was to be given by military labour on the spot. The 10th Railway Company Royal Engineers and an Indian Coolie Corps under Royal Engineer officers were appointed



to assist in the railway work. The result was most unsatisfactory. The contractors had had no previous experience of railway construction under the special conditions that prevail in war; the shipping of the railway material had not been properly organized, so it was almost impossible to obtain the stores in the order in which they were required. Both in the construction and the management a most striking want of system and organization was observable, and the services of the Royal Engineer Railway Company and of the trained Indian coolies were not properly and fully availed of. After considerable delay about 20 miles of line were completed, when the expedition was abandoned and the British forces evacuated the country.

In the recent campaigns, which have resulted in the re-capture of Khartoum, a large proportion of the success of the Egyptian forces may be attributed to the successful provision of railway communications.

Railway work in recent  
Soudan campaigns.

During the first advance on Dongola in 1896 the railway was re-constructed from Sarras to Akasheh (this part having been abandoned on the evacuation 10 years previously) and was extended during the operations to Kasheh and subsequently to Karma. This admitted of stores being brought up and supplies collected for the next advance of the Sirdar's forces on Abu Hamed and Berber. In the meanwhile, during the interval between the two advances, an entirely new line had been commenced directly across the desert from Wady Halfa towards Abu Hamed so as to avoid the long detour made by the Nile between the two places; and shortly after the fall of Abu Hamed and Berber, the railway reached the former place and began to be rapidly pushed on towards the latter. This enabled vast quantities of stores to be collected and troops to be concentrated for the final advance on Khartoum in 1898.

The railway constructed in the Soudan was of a different nature to what would be required for Indian warfare; it is on a broader gauge (3 ft. 6 in.) heavier and of a more permanent character, being in fact intended to eventually form a link in the through communication from the north to the south of the African Continent. Most of the country through which it passed was flat and open desert. Though the ground, however, was easy, other difficulties were enormous. The want of water, the scarcity of labour, and the vast distance from which all plant and materials had to be brought—part of this distance being at that time not even connected up by railway—all combined to delay the operations and render them a matter of great difficulty. The rate of progress averaged about a mile a day.

Altogether these campaigns under Lord Kitchener form an excellent example of the strategical advantages gained by the construction of railways for war purposes; and the actual construction of the lines was a fine picture of difficulties overcome by energy, resourcefulness, and good organization. At the same time it must not be forgotten that in Indian campaigns the conditions will be very different and far more difficult. The Sirdar had time on his side and could afford to let the advance of his forces wait on the progress of his railway, as every day he delayed his advance not only

strengthened his own position, but weakened that of his foe, whose forces were losing faith in their leader and deserting his standard. An Indian commander, on the other hand, may, as in 1895, have to take his forces as rapidly as possible through 200 miles of mountainous country, across broad and rapid rivers and over lofty mountain passes to the relief of a beleaguered garrison who are not expected to be able to hold out long; or he may be called upon at a late season of the year to pursue and inflict chastisement upon powerful and warlike tribes and to complete his task and leave their country before the winter snows make military operations impossible. Such different conditions require a very different organization.

There are two examples of railway construction in Asiatic campaigns; both of these are described by Mr. J. R. Bell, C.E., in the Journal of the United Service Institution of India for August 1892. In the Russian Central Asian Campaign in 1880 General Skobelev laid a light Décauville Railway from the Caspian Sea to Akhal Tepe, a distance of 135 miles. The country it crossed was an absolutely flat and arid desert. Nearly all supplies had to be brought up from the base and all water had to be distilled from the Caspian Sea. During this campaign the whole of this light line was afterwards connected to the Russian standard gauge, and now forms part of the permanent communications of that region. Military labour was employed on it to a large extent. Mr. Bell does not give any details of the laying of the Décauville line, nor does he say how long it took, but the conversion of it to the broad gauge, which is said to have been carried out "under the enemy's fire," averaged a rate of 14½ miles per month or less than half a mile a day.

The other example is the line constructed across the Jacobabad Put to Sibi at the beginning of the second phase of the last Afghan War, after the death of Cavagnari in 1879. This is the only example of a line laid actually in war time in India, though the Bolan line and others were built under conditions very similar to those of war. On the Sibi line, as in the Russian one, the country is an absolute desert, and everything,—including fuel, food, and water—had to be brought up from the rear. The gauge was 5 ft. 6 in. and the organization was entirely civil. The time taken to construct 135 miles was 101 days, or 40 miles per month. It would have been completed sooner but for a strike amongst the workmen, which resulted in 14 consecutive days being lost. The material employed on the Sibi line was not specially designed for rapid laying, but was the ordinary Indian State Railway plant, consisting of rails, 24 feet long, and wooden sleepers. Mr. Bell remarks on the delay caused by want of uniformity in the material supplied, no less than seven different sorts being used.

From the construction of the Sibi line several useful lessons may be drawn. One is that, as strikes are fatal to rapid work, military labour, which is not subject to strikes, should be employed. Another is that absolute uniformity of material is essential, and that the material must be specially designed for rapid laying. Some of the other lessons

particularly brought to notice by Mr. Bell in the paper above mentioned will be referred to later when discussing in detail a system to suit Indian requirements.

Though the records of past campaigns do not afford an example of field railways of the nature that would be required in Indian warfare, that is to say, of an organization perfected in peace time by which light temporary lines could be laid with extreme rapidity in war time, yet an examination of the organization adopted by European armies for this end would be highly instructive. The conditions under which temporary light railways would be required in European warfare more nearly resemble our own. The improvement in armaments and in organization of war of modern armies tend to shorten the duration, of at any rate the decisive period, of latter day campaigns. Rapidity in mobilization and concentration and continuity of action are more than ever of importance. Temporary railways to be useful must be capable of being constructed with the utmost rapidity.

It is only since the last great continental war that the European Powers have provided themselves with railway troops. They have worked out their organization with the utmost attention to details, and, though experience of their action in war time is lacking a study of the principle which has governed their introduction, and of the result of their trials in field manœuvres, under conditions as nearly as possible similar to those of war, cannot fail to be of value.

The French, German, and Austrian armies have adopted systems which are similar in principle, although differing in details. The gauge of the French and German lines is 60 centimetres (1 ft. 11½ in.); that of the Austrian 70 centimetres (2 ft. 3½ in.). The plant and rolling-stock employed are of the Décauville type. The rails and sleepers (the latter of steel) are rivetted together in fixed lengths or bays. The bays, which can be easily handled and rapidly laid, are connected together by fish-plates at each joint which are carried permanently bolted to the end of the rails. The rolling-stock is of the bogie type, either single or double, the former carrying generally 5 tons and the latter 9. The locomotives are designed for the maximum of work with the minimum of weight. The following quotation from an article on Military Railways\* in the "Révue Militaire de l'Etranger" of April 1892 describing the German system gives a good idea of the conditions to which it is found that lines of this nature must conform:—

"Experience shews that a curve of 30. m. radius is the least that can be employed on any line of 60. c.m. gauge work by locomotives. .... Taking the average weight of a train at from 60 to 70 tons, the determination of the longitudinal section of the line possesses the following points:

"Gradients less steep than 1 in 50 possess no inconvenience, and need not interfere with the regularity of the train service. On grades

\* Translated by Lieutenant E. H. M. Leggatt, R.E., and published as a Professional Paper of the Corps of Royal Engineers, 1897.

between 1 in 40 and 1 in 50 of a greater length than 400 to 500 metres intermediate lengths of level line should be provided of a length double that of the train. Gradients steeper than 1 in 40 are avoided, as far as possible, in the interests of the train service, and banking engines are necessary when the grade is longer than 300 metres. Similarly for grades of 1 in 30 and 1 in 25 when the length exceeds 200 and 100 metres respectively. Gradients of 1 in 18 can only be passed when not exceeding the length of the train or when the latter can get a 'run' at the bank. All sharp changes of grade are avoided, and grades should be straight as far as possible. When the line is at the same time on curve and gradient, the latter must not be more than 1 in 60 and the radius of the curve 200 metres or more; while portions of the line leading to a grade of this kind should also not be on a curve of less than 200 m. radius."

Lines of this nature can be laid on any good road, provided the gradients and curves do not exceed those given above; but it is evident that in difficult country, in the absence of such a road, a great deal of cutting would be required to secure the necessary conditions.

For the construction and management of military lines special railway corps are kept up; these are carefully trained in their duties in peace time, and further are thoroughly and practically exercised during field manœuvres under conditions approaching as nearly as possible those of war. The German Railway Troops are divided into Construction Companies, Traffic Companies, and Workmen Companies. In the manœuvres of 1892 a field line, 70 kilometres (44 miles) long, was constructed, worked for two and a half weeks and dismantled.\* The troops employed were one Construction and four Workmen Companies on the construction and four Traffic Companies on the management of the completed line. The strength of the constructing troops (without the Traffic Companies) was 17 officers and 1,030 men, and the line was laid in nine working days, thus giving a rate of progress of  $4\frac{1}{2}$  miles per day. As construction was not continued at night, this is very good progress; but it is not stated what was the nature of the country where the line was laid, and it can only be concluded that the amount of cutting, embankment, and bridge work was very slight.

It is quite evident, however, that the amount of cutting, embankment, ballasting, and bridging which would be required for railways, such as are described in the extract given above from the article in the *Révue Militaire de l'Etranger*, render their construction even on ordinary country in war time at a pace quick enough to keep up with, or even close in the rear of, marching troops a matter of impossibility. The Germans and Austrians have fully recognized this and provided for it. Their experience has led them to the conclusion that a railway for locomotive traction cannot be constructed

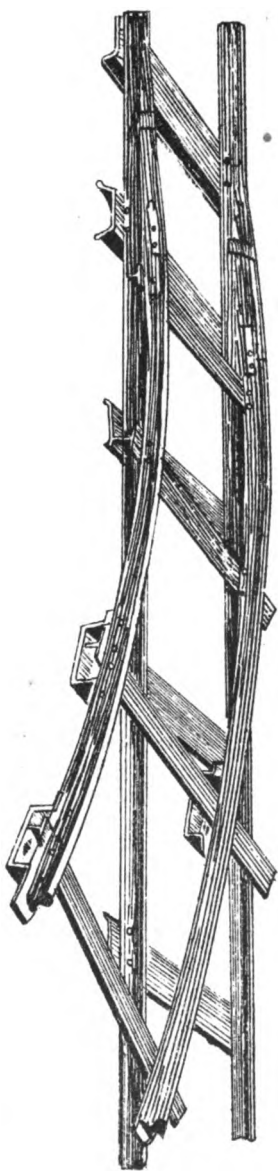
\* Professional Papers of the Corps of Royal Engineers, Volume I, Paper IV (Foreign Translation Series), "Narrow Gauge Railways for Military Purposes." By Lieutenant E.H.M. Leggatt, R.E.

quickly enough to follow troops in the field, but is only suitable for use when time is available. They have therefore, for the former purpose, provided themselves with lighter, simpler, and more flexible lines, admitting of much more rapid laying, with steeper gradients, sharper curves, and no ballasting, and intended for use with horse traction.

The advantage of traction on rails over carts on roads is very great. The Germans estimate that the power required to draw a given load on rails is only one-fifth of that required to draw the same load on a good metalled road, and one-fifteenth of that required on a bad road. The carrying capacity, moreover, of a line of horse tramway properly organized is said to be no less than that of a light line with steam traction. The Austrians, no doubt owing to the fact that their armies would in time of war have to operate in mountainous and comparatively roadless countries, have gone into the question of field tramways in great detail, and the system they have adopted is worth noting, as their conditions are not unlike those of India. The gauge of their horse lines is 70 c.m., the same as that of their light steam lines. Light flat-footed rails are used, made up in bays. The joint is merely a lug on one rail with a hook to catch over it on the other. This prevents the rails being forced apart and is exceedingly flexible and adaptable to inequalities of the ground. No ballast is used; the line can be laid on any road or with very little preparation on ordinary ground, small hollows being filled up with brushwood, etc. Instead of points and crossings, bent rails with bevelled ends are used to fit over and bridge the other line as shewn in the illustration; these are put on and removed when required. For curves special curved bays are provided, 2 metres long, with a radius of curvature of 5 metres. Four of these bays will effect a change of direction of 90 degrees. The rolling-stock is based on the ordinary four-wheeled bogie which can be used singly with the framework of a small truck or made up into double bogie wagons of various descriptions for carriage of stores and passengers or for sick and wounded.

In order to lay the line with the utmost rapidity, everything is foreseen and arranged for, and a complete system is laid down by which the material is conveyed to the rail-head, and the line laid, levelled, and packed up by working parties. Frequent reliefs are necessary, and, the work being very arduous, it is considered that each relief should work at the utmost six hours out of the twenty-four. It is stated that the Austrians can lay such a line at the rate of 1 kilometre per hour, but the Germans only claim a rate of 650 metres per hour. Taking the latter figure as more nearly approaching what could be accomplished under service conditions, we arrive at a working rate of from 9 to 10 miles per twenty-four hours. This rate, however, could only be attained by thoroughly experienced troops and after long practice.

The Austrians estimate that a pair of horses can draw a double bogie wagon with three tons load on a line with a ruling gradient of 1 in 20 at an average speed of 4 kilometres per hour. On such a line, with changes of horses at every stage, 15 kilometres



**INCLINED PLANES FOR CROSSINGS.**



apart, they estimate that 900 tons of stores could be carried daily a distance of four stages or 60 kilometres. The very high carrying capacity indicated above shews that a line of this nature would be of enormous value in war.

The Austrians are not content, however, with arranging for horse traction for light lines. There may be circumstances when horses themselves are scarce or fodder difficult to obtain. They propose in such cases to employ manual labour for the traction of their field tramways. The comparative power of men and horses on a tramway, as estimated by the Austrians, is about 1 to 5. Therefore a load that would require two horses could be drawn by ten men. Moreover, the tractive power of a man on a tramway is said to be greater than that of a horse on an unmetalled road, provided the gradient does not exceed 1 in 20. Besides the fact that horses are more likely to be scarce than men, there are certain other advantages in man traction. For example, with horse traction the teams require a path about three feet wide alongside the rails to walk on. This strip, if not metalled, cuts up rapidly from the animal's feet. With man traction a special track is not necessary. Also every pair of animals has to be accompanied by a driver who, so far from adding to their tractive powers, is a dead weight to be carried, and the weight of the daily food which has to be carried for the horses and a driver is about 63 lbs., whereas that for 10 men would be only 30 lbs. It is evident, therefore, that under certain circumstances tramways could be advantageously worked by manual traction.

#### UNDER WHAT CONDITIONS A FIELD RAILWAY SYSTEM COULD BE ADOPTED TO SUIT INDIAN REQUIREMENTS.

Having now noted the conditions under which railways have been constructed in past wars, and having examined the organizations which continental Powers have selected as most suited to their requirements, it remains to be shown how a field railway system can be adapted to the conditions of Indian campaigns.

The physical conformation of the country beyond the Indian border is distinctly unfavourable to rapid progress in construction. The campaigns for which the Indian Administration has to prepare are of two kinds, namely,—firstly, expeditions against the frontier tribes dwelling in the border hills; and, secondly, a great war in Afghanistan either against the Afghans or against Russia. The former are generally undertaken at short notice and are of comparatively short duration. The second would undoubtedly be very protracted.

The permanent broad gauge lines in the Punjab do not extend right up to the edge of the border mountains, so military forces starting on frontier expeditions have to march from the railway termini to the mouths of the passes for distances varying from 10 to over 100 miles. The permanent 2 ft. 6 in. gauge lines, which it is understood that the Government intend to construct towards



some of the more important advanced strategic bases, will obviate this on these particular lines of advance, but it is not expected that such lines will be constructed to every frontier pass; in fact, one may venture to assume that the only lines of this nature that will be built for some years to come will be one from Nowshera to Dargai at the foot of the Malakand Pass (now under construction) and perhaps one from Khushalgarh to Kohat or further. There will thus remain several parts of the border distant many miles from the nearest railway.

A field railway system, to be of any value whatever for Indian campaigns, must be capable of being used, not only on the open country this side of the border hills, but also for a considerable distance into the mountainous country as well. It must be capable of being constructed with extreme rapidity so as to be ready for use directly the troops move off from the base, and to be able to follow them up in their advance.

It is evident that, taking into consideration the nature of the country and the normal conditions of Indian campaigns, only under specially favourable circumstances will it be possible to construct a line for locomotive traction for any distance. The cis-border country is generally open and flat, and in many cases a road exists leading in the direction of the advance of the expedition. Under circumstances such as these, if also a certain amount of time is available between the day on which the expedition is decided on and that on which the troops actually advance, then, provided a thoroughly organized system to be in existence, the construction of some length of locomotive line would be possible. A fortnight's warning should in such cases admit of from 30 to 50 miles being laid according to the nature of the ground. When an expedition has to start without any previous warning, as in the case of a sudden rising or when the country near the base of operations is difficult, the time will not admit of a line for steam traction being laid sufficiently quickly to be of use in the early stages of the campaign. In such cases it would not be worth while undertaking such a line unless the campaign was expected to be of long duration.

In every case, however, lighter, more flexible, and more rapidly laid lines for use with *bullock* traction would be perfectly feasible and exceedingly useful. Such lines require so little preparation of the ground that they could be extended with great rapidity so as to follow close behind the troops for a very considerable distance along the line of communications. Similarly, in cases where a line for steam traction has been provided for a certain distance, a bullock traction line could be commenced from the place where the former stopped. In the event of protracted operations the nearest portion of the bullock traction line could be converted bit by bit for use with locomotives.

The principle therefore on which it is considered that field railways can be made use of in Indian warfare is to use the lightest and simplest form of line with bullock traction in order

General principle on which light railways could best be employed in Indian wars.

to keep as close behind the troops as possible, while the locomotive line would be only employed where time and the nature of the country permitted.

It may be that this is going somewhat beyond the scope of the subject as defined in the title set for this essay. A bullock tramway is hardly a light railway in the general acceptance of the latter term. The task, however, which the writer has had in view is to describe an organization which will be capable of replacing, as far as possible, the forms of transport now employed, and particularly of reducing the vast numbers of animals and drivers which are now required and are so difficult to procure. To narrow the subject down solely to the employment of locomotive lines would be to fall considerably short of an entire solution of the question. The experiences gained from the railway work carried out in past wars, and from the trials of continental systems in peace manœuvres, point unmistakeably to the conclusion that in the difficult country, where Indian campaigns are fought, it would be impossible to, construct lines for locomotive traction with sufficient rapidity to be of use in the earlier stages of a campaign. Indian frontier wars are usually commenced with but short notice; the greatest rush of stores to be transported is during the first few weeks and the whole campaign is often over in a few months. A locomotive line, on account of the cutting and bridging to be done, would not have progressed far by the time the troops began to return, and would have been of little, if any, use during the time of greatest strain on the transport arrangements. A bullock tramway line, for which but little preparation is required, could, on the other hand, be pushed through with great rapidity, and, even in mountainous country, the construction of it would take no longer than that of a camel-road.

The advantages gained by employing bullocks on a tramway line

Advantages of bullock traction lines of rail over cart or pack transport.

over ordinary cart or pack transport is enormous and well worth the labour and initial expense involved. The tractive power of a pair of bullocks may be taken at two-thirds that of a pair of horses; if the Germans find, as has been mentioned previously, that a pair of horses can draw on a tramway line, with a ruling gradient of 1 in 20, a wagon with a load of three tons, we may assume that a pair of bullocks will, under the same circumstances, take a wagon loaded with two tons. The regulation load of a two-bullock cart on an ordinary road is 800 lbs., so the advantage gained by using the tramway is to increase the tractive power of the bullocks from 800 lbs. to 4,480 lbs., or  $5\frac{1}{2}$  times.

As already mentioned, the Germans consider that rails increase the tractive power of animals in the ratio of 5 to 1 over good metalled roads, and 15 to 1 over bad roads. The English Text-books\* give

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\* R. E. Aide Memoire, 1st Edition, Part I, paragraph 489.

very similar figures, namely, that a horse can draw at a uniform rate—on a good road 3 tons, on a bad road 1 ton, and on a level tramway 16 tons. We are therefore well within the limit of power of a pair of bullocks if we only increase the weight they have to draw to  $5\frac{1}{2}$  times that for a road, as the roads on which bullock carts habitually carry 800 lbs. may certainly be classed as bad ones. On stages where the line is level the load could safely be raised to 4 tons.

On those portions of the line of communication, where bullock tramways were employed, the number of bullocks required would be reduced to less than one-fifth of the number required if carts were used. Comparing bullock tramways with camel transport, we find that to carry 2 tons 11 camels (400 lbs. each) would be required, so that two bullocks could be substituted for every 11 camels.

A further advantage ensues in the saving of fodder to be carried owing to the smaller number of animals required. As has already been pointed out, the question of fodder supply for animals in country, where none is procurable, is a source of great anxiety and often delays the advance of troops.

There is no reason why other animals than bullocks should not be employed to draw the wagons. Mules or ponies would do equally well, and would have the advantage over bullocks in speed. Finally, if animals were scarce or the supply of fodder a matter of difficulty, coolie labour, of which an immense quantity is always available, could be made use of.

#### DESCRIPTION OF THE SYSTEM PROPOSED FOR ADOPTION, WITH DETAILS OF THE MATERIALS, ROLLING-STOCK, BRIDGES, ETC.

(a) *Locomotive lines*.—For a locomotive line the first condition to be conformed to is that it should admit of being laid with the utmost rapidity. It is also important that the carrying capacity of the line when completed should be equal to the great strain that will inevitably be put upon it. The last condition, however, clashes to a certain extent with the first, for an increase of carrying power means heavier engines and rolling-stock, heavier rails, more ballast, and stronger bridges. All these militate against rapidity of laying. How far the one should be sacrificed to the other is a matter which requires a good deal of consideration; though it may not be out of place to point out that the lightest railway is immensely superior to carts or pack animals, and that a light line comparatively weak in carrying power, but quickly completed, is better for military purposes than a stronger one which can only be finished by the time the troops are beginning to march back. In our case the consideration of this problem is limited by certain conditions. In the first place, the gauge is fixed at 2 ft. 6 in. This gauge has been selected by Government for the permanent light frontier lines, and it would not do to have another change in addition to the one from the broad to the narrow gauge. It is not so much the gauge, however, that affects the lightness as the nature of the engines and rolling-stock employed. It will be necessary to use the engines and vehicles of the permanent 2 ft. 6 in. lines on the field extensions also. Not only will this be necessary

when field lines are made in immediate continuation of existing permanent 2 ft. 6 in. lines, but also in other cases it would be of great advantage to be able to obtain the rolling-stock or part of it from the reserves belonging to permanent existing lines. In the absence of definite information as to what class of stock will be adopted for the permanent lines, it is not possible to say what will be the effect of this condition on the formation, curves, gradients, and bridges of the field lines.

In order to be able to run with safety on a line hastily constructed in war time, that is to say, on light rails, rough track, little or no ballasting, and rough trestle bridges, the principal essentials are slow speed and light axle load. Now on a military line speed is a secondary consideration, provided the train service is constant and regular, so this condition can be easily complied with. To obtain a light axle load small and light vehicles are necessary, and in order to get round sharp curves, they should be of the bogie form with the fixed wheel base short. For the steep gradients, which, in order to avoid heavy cutting, are necessary, the engine must be powerful. Increase of power, however, in engines beyond a certain point causes increase of axle load, so it is better on parts of the line, where the gradients are severe, to employ short trains or two engines to a train, than to entirely sacrifice lightness to power.

If, when deciding on the rolling-stock to be adopted for the permanent 2 ft. 6 in. gauge frontier lines, the Government of India bear in mind the advisability of adapting it for hasty extensions in war time, then no doubt the general principles enumerated above will be complied with; if, however, the question is decided without reference to such requirements, then the construction of locomotive lines in war time will be greatly restricted.

Lines constructed in war time are intended primarily for the transport of stores and supplies, and not, except in emergent cases, of troops. It must be remembered that, while a line is under construction, all the permanent-way material has to be conveyed by it to the rail-head in addition to the ordinary traffic of military supplies. Its capacity will thus be strained to the utmost without carrying troops. Moreover, at the time when the troops are concentrating, the line will not be ready, so everything that has legs of its own to travel on must use them. In special cases when the heat of the climate makes it desirable to rail the troops, and time admits of the start of the expedition being delayed till the railway is ready, troops might be carried on it; also in ordinary cases when the line is completed it may be used to a certain extent to convey small detachments or to move up troops in relief. A few light open-sided passenger cars could be kept for this purpose, though, as a rule, nothing but baggage wagons should run on the line. In the Soudan British troops were sometimes railed in open baggage wagons under the midday sun, and in urgent cases the same could be done on the Indian frontier, a light roof covering or awning being added if necessary. The railway is in reality, however, merely to take the place of the transport carts of animals.

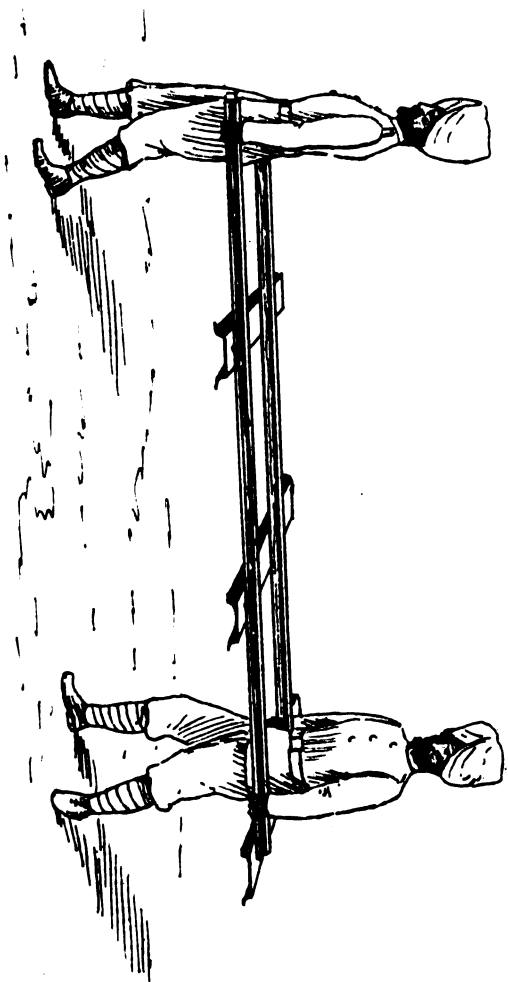
Sick and wounded would of course always be conveyed back from the front by railway in specially constructed ambulance cars with good springs. These cars should be capable of being drawn by bullocks on the bullock line and by locomotives on the other line.

In order to lessen the cutting and embankment, gradients and curves must be admitted of greater severity than on permanent lines. It is impossible, however to lay down definite rules on these points in the absence of knowledge as to the rolling-stock that will run on them. It ought not to be necessary to impose a ruling gradient of less than 1 in 40 and with light lines 1 in 25 could be admitted in short lengths. Sharp curves should of course not be situated on steep gradients; if necessary in such cases, the gradients must be eased to compensate for the extra friction.

The rails should be attached to steel sleepers in bays of such length that they can be easily handled by two men, and rapidly jointed, the fish-plates being kept fixed to one end. Ballast would not at first be employed except where the nature of the ground rendered it absolutely necessary. Points and crossings would be of the simplest form and provided in ready-made bays.

The necessity for bridging the numerous deep ravines that intersect the border country is likely to lead to delay in construction of the line unless a careful organization is in existence. The most suitable material for hasty bridge construction is timber. Some excellent examples of hasty timber railway bridges are given in the official text-book of "Instruction in Military Engineering, Volume I, Part III, Military Bridges," and it is needless to reproduce them here. For short spans the strutted form of timber bridge is probably the best, and it would be very desirable to have in stock properly squared baulks for bridges of this nature, of lengths to suit various spans, together with bolts for the joints. If the parts were marked and the railway corps had practice in putting them together in peace time, they might be most rapidly constructed in war. For larger spans trestle bridges are more suitable and in the same way timbers suitable for trestles of various heights could be stocked and practised with. The abutments of such bridges would, in the absence of mortar, often have to be built of dry stone. This requires to be bonded with timber bonds, both longitudinal and transverse, to give stability. Timber cribwork, filled with rough stone packing, makes very strong abutments, and is particularly suitable where stone is inferior in quality.

Steel or iron could be made use of for bridges if the materials were kept in stock ready for immediate use. For shorter spans the ordinary rolled I girders would do. For longer bridges lattice girders to suit various spans could be made up in peace time and the parts kept, so that they would only require bolting together on the spot. The railway troops could be trained in putting them together.



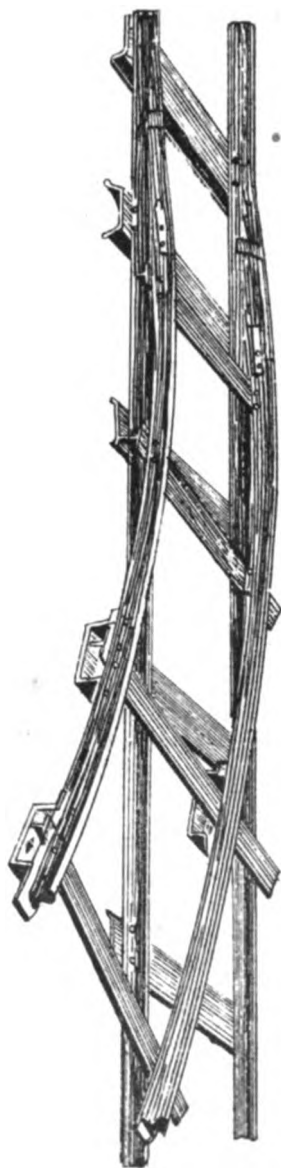
ONE BAY OF LOCOMOTIVE LINE.

quickly enough to follow troops in the field, but is only suitable for use when time is available. They have therefore, for the former purpose, provided themselves with lighter, simpler, and more flexible lines, admitting of much more rapid laying, with steeper gradients, sharper curves, and no ballasting, and intended for use with horse traction.

The advantage of traction on rails over carts on roads is very great. The Germans estimate that the power required to draw a given load on rails is only one-fifth of that required to draw the same load on a good metalled road, and one-fifteenth of that required on a bad road. The carrying capacity, moreover, of a line of horse tramway properly organized is said to be no less than that of a light line with steam traction. The Austrians, no doubt owing to the fact that their armies would in time of war have to operate in mountainous and comparatively roadless countries, have gone into the question of horse tramways in great detail, and the system they have adopted is worth noting, as their conditions are not unlike those of India. The gauge of their horse lines is 70 c.m., the same as that of their light steam lines. Light flat-footed rails are used, made up in bays. The joints are merely a lug on one rail with a hook to catch over it on the other. This prevents the rails being forced apart and is exceedingly flexible and adaptable to inequalities of the ground. No ballast is used, the line can be laid on any road or with very little preparation on ordinary ground, small hollows being filled up with brushwood, etc. Instead of points and crossings, bent rails with bevelled ends are used to fit over a simple bridge the other line as shown in the illustration; these are put on and removed when required. For curves special curved bays are provided, 2 metres long, with a radius of curvature of 5 metres. Four of these bays will effect a change of direction of 90 degrees. The rolling-stock is based on the ordinary four-wheeled bogie which can be used singly with the framework of a small truck or made up into double bogie wagons of various descriptions for carriage of stores and passengers or for sick and wounded.

In order to lay the line with the utmost rapidity, everything is foreseen and arranged for, and a complete system is laid down by which the material is conveyed to the rail-head, and the line laid, levelled, and packed up by working parties. Frequent reliefs are necessary, and, the work being very arduous, it is considered that each horse should work at the utmost six hours out of the twenty-four. It is stated that the Austrians can lay such a line at the rate of 1 kilometre per hour, but the Germans only claim a rate of 650 metres per hour. Taking the latter figure as more nearly approaching what could be accomplished under service conditions, we arrive at a working rate of from 9 to 10 miles per twenty-four hours. This rate, however, could only be attained by thoroughly experienced troops and after long practice.

The Austrians estimate that a pair of horses can draw a double bogie wagon with three tons load on a line with a ruling gradient of 1 in 20 at an average speed of 4 kilometres per hour. On such a line, with changes of horses at every stage, 15 kilometres



**INCLINED PLANES FOR CROSSINGS.**





apart, they estimate that 900 tons of stores could be carried daily a distance of four stages or 60 kilometres. The very high carrying capacity indicated above shews that a line of this nature would be of enormous value in war.

The Austrians are not content, however, with arranging for horse traction for light lines. There may be circumstances when horses themselves are scarce or fodder difficult to obtain. They propose in such cases to employ manual labour for the traction of their field tramways. The comparative power of men and horses on a tramway, as estimated by the Austrians, is about 1 to 5. Therefore a load that would require two horses could be drawn by ten men. Moreover, the tractive power of a man on a tramway is said to be greater than that of a horse on an unmetalled road, provided the gradient does not exceed 1 in 20. Besides the fact that horses are more likely to be scarce than men, there are certain other advantages in man traction. For example, with horse traction the teams require a path about three feet wide alongside the rails to walk on. This strip, if not metalled, cuts up rapidly from the animal's feet. With man traction a special track is not necessary. Also every pair of animals has to be accompanied by a driver who, so far from adding to their tractive powers, is a dead weight to be carried, and the weight of the daily food which has to be carried for the horses and a driver is about 63 lbs., whereas that for 10 men would be only 30 lbs. It is evident, therefore, that under certain circumstances tramways could be advantageously worked by manual traction.

#### UNDER WHAT CONDITIONS A FIELD RAILWAY SYSTEM COULD BE ADOPTED TO SUIT INDIAN REQUIREMENTS.

Having now noted the conditions under which railways have been constructed in past wars, and having examined the organizations which continental Powers have selected as most suited to their requirements, it remains to be shown how a field railway system can be adapted to the conditions of Indian campaigns.

The physical conformation of the country beyond the Indian border is distinctly unfavourable to rapid progress in construction. The campaigns for which the Indian Administration has to prepare are of two kinds, namely,—firstly, expeditions against the frontier tribes dwelling in the border hills; and, secondly, a great war in Afghanistan either against the Afghans or against Russia. The former are generally undertaken at short notice and are of comparatively short duration. The second would undoubtedly be very protracted.

The permanent broad gauge lines in the Punjab do not extend right up to the edge of the border mountains, so military forces starting on frontier expeditions have to march from the railway termini to the mouths of the passes for distances varying from 10 to over 100 miles. The permanent 2 ft. 6 in. gauge lines, which it is understood that the Government intend to construct towards

some of the more important advanced strategic bases, will be on this on these particular lines of advance, but it is not expected that such lines will be constructed to every frontier pass; in fact, we may venture to assume that the only lines of this nature that will be built for some years to come will be one from Nowshera to Dargah at the foot of the Malakand Pass (now under construction) and perhaps one from Khushalgarh to Kohat or further. There will thus remain several parts of the border distant many miles from the nearest railway.

A field railway system, to be of any value whatever for Indian campaigns, must be capable of being used not only on the open country this side of the border hills, but also for a considerable distance into the mountainous country as well. It must be capable of being constructed with extreme rapidity so as to be ready for use directly the troops move off from the base, and to be able to follow them up in their advance.

It is evident that, taking into consideration the nature of the country and the normal conditions of Indian campaigns, only under specially favourable circumstances will it be possible to construct a line for locomotive traction for any distance. The country is generally open and flat, and in many cases a road exists leading in the direction of the advance of the expedition. Under circumstances such as these, if also a certain amount of time is available between the day on which the expedition is decided on and that on which the troops actually advance, then, provided a thoroughly organized system to be in existence, the construction of a makeshift locomotive line would be possible. A fortnight's warning would in such cases admit of from 30 to 50 miles being laid according to the nature of the ground. When an expedition has to start without any previous warning, as in the case of a sudden rising or when the country near the base of operations is difficult, the time will not admit of a line for steam traction being laid sufficiently early to be of use in the early stages of the campaign. In such cases it would not be worth while undertaking such a line unless the campaign was expected to be of long duration.

In every case, however, lighter, more flexible, and more rapidly laid lines for use with bullock traction would be perfectly feasible and exceedingly useful. Such lines require no preparation of the ground that they could be extended with great rapidity so as to follow close behind the troops for a very considerable distance along the line of communications. Similarly, in cases where a line for steam traction has been provided for a certain distance, a bullock traction line could be commenced from the place where the former stopped. In the event of protracted operations the nearest portion of the bullock traction line could be converted bit by bit for use with locomotives.

The principle therefore on which it is considered that field railways can be made use of in Indian warfare is to use the lightest and simplest

General principle on which light railways could best be employed in Indian wars.

form of line with bullock traction in order to keep as close behind the troops as possible, while the locomotive line would be only employed where time and the nature of the country permitted.

It may be that this is going somewhat beyond the scope of the subject as defined in the title set for this essay. A bullock tramway is hardly a light railway in the general acceptance of the latter term. The task, however, which the writer has had in view is to describe an organization which will be capable of replacing, as far as possible, the forms of transport now employed, and particularly of reducing the vast numbers of animals and drivers which are now required and are so difficult to procure. To narrow the subject down solely to the employment of locomotive lines would be to fall considerably short of an entire solution of the question. The experiences gained from the railway work carried out in past wars, and from the trials of continental systems in peace manœuvres, point unmistakably to the conclusion that in the difficult country, where Indian campaigns are fought, it would be impossible to construct lines for locomotive traction with sufficient rapidity to be of use in the earlier stages of a campaign. Indian frontier wars are usually commenced with but short notice; the greatest rush of stores to be transported is during the first few weeks and the whole campaign is often over in a few months. A locomotive line, on account of the cutting and bridging to be done, would not have progressed far by the time the troops began to return, and would have been of little, if any, use during the time of greatest strain on the transport arrangements. A bullock tramway line, for which but little preparation is required, could, on the other hand, be pushed through with great rapidity, and, even in mountainous country, the construction of it would take no longer than that of a camel-road.

The advantages gained by employing bullocks on a tramway line

Advantages of bullock traction lines of rail over cart or pack transport.

over ordinary cart or pack transport is enormous and well worth the labour and initial expense involved. The tractive power of a pair of bullocks may be taken at two-thirds that of a pair of horses; if the Germans find, as has been mentioned previously, that a pair of horses can draw on a tramway line, with a ruling gradient of 1 in 20, a wagon with a load of three tons, we may assume that a pair of bullocks will, under the same circumstances, take a wagon loaded with two tons. The regulation load of a two-bullock cart on an ordinary road is 800 lbs., so the advantage gained by using the tramway is to increase the tractive power of the bullocks from 800 lbs. to 4,480 lbs., or  $5\frac{1}{2}$  times.

As already mentioned, the Germans consider that rails increase the tractive power of animals in the ratio of 5 to 1 over good metalled roads, and 15 to 1 over bad roads. The English Text-books\* give

\* R. E. Aide Memoire, 1st Edition, Part I, paragraph 489.

very similar figures, namely, that a horse can draw at a uniform rate—on a good road 3 tons, on a bad road 1 ton, and on a level tramway 1½ tons. We are therefore well within the limit of power of a pair of bullocks if we only increase the weight they have to draw to 4 tons, that for a road, as the roads on which bullock carts habitually carry 800 lbs. may certainly be classed as bad ones. On stages where the line is level the load could safely be raised to 4 tons.

On those portions of the line of communication, where bullock tramways were employed, the number of bullocks required would be reduced to less than one-fifth of the number required if carts were used. Comparing bullock tramways with camel transport, we find that to carry 2 tons 11 camels (400 lbs. each) would be required, so that two bullocks could be substituted for every 11 camels.

A further advantage ensues in the saving of fodder to be carried owing to the smaller number of animals required. As has already been pointed out, the question of fodder supply for animals in country, where none is procurable, is a source of great anxiety and often delays the advance of troops.

There is no reason why other animals than bullocks should not be employed to draw the wagons. Mules or ponies would do equally well, and would have the advantage over bullocks in speed. But, if animals were scarce or the supply of fodder a matter of difficulty, coolie labour, of which an immense quantity is always available, could be made use of.

#### DESCRIPTION OF THE SYSTEM PROPOSED FOR ADOPTION, WITH DETAILS OF THE MATERIALS, ROLLING-STOCK, BRIDGES, ETC.

(a) *Locomotive lines*.—For a locomotive line the first condition to be conformed to is that it should admit of being laid with the greatest rapidity. It is also important that the carrying capacity of the line when completed should be equal to the great strain that will inevitably be put upon it. The last condition, however, clashes to a certain extent with the first, for an increase of carrying power means heavier engines and rolling-stock, heavier rails, more ballast, and stronger bridges. All these militate against rapidity of laying. How far we should be sacrificed to the other is a matter which requires a good deal of consideration; though it may not be out of place to point out that the lightest railway is immensely superior to carts or pack animals, and that a light line, comparatively weak in carrying power, but quickly completed, is better for military purposes than a stronger one which can only be finished by the time the troops are beginning to march back. In our case the consideration of this problem is limited by certain conditions. In the first place, the gauge is fixed at 3 ft. 6 in. This gauge has been selected by Government for the permanent light frontier lines, and it would not do to have another change in addition to the one from the broad to the narrow gauge. It is not so much the gauge, however, that affects the lightness as the nature of the engines and rolling-stock employed. It will be necessary to use the engines and vehicles of the permanent 3 ft. 6 in. lines on the field extensions also. Not only will this be necessary

when field lines are made in immediate continuation of existing permanent 2 ft. 6 in. lines, but also in other cases it would be of great advantage to be able to obtain the rolling-stock or part of it from the reserves belonging to permanent existing lines. In the absence of definite information as to what class of stock will be adopted for the permanent lines, it is not possible to say what will be the effect of this condition on the formation, curves, gradients, and bridges of the field lines.

In order to be able to run with safety on a line hastily constructed in war time, that is to say, on light rails, rough track, little or no ballasting, and rough trestle bridges, the principal essentials are slow speed and light axle load. Now on a military line speed is a secondary consideration, provided the train service is constant and regular, so this condition can be easily complied with. To obtain a light axle load small and light vehicles are necessary, and in order to get round sharp curves, they should be of the bogie form with the fixed wheel base short. For the steep gradients, which, in order to avoid heavy cutting, are necessary, the engine must be powerful. Increase of power, however, in engines beyond a certain point causes increase of axle load, so it is better on parts of the line, where the gradients are severe, to employ short trains or two engines to a train, than to entirely sacrifice lightness to power.

If, when deciding on the rolling-stock to be adopted for the permanent 2 ft. 6 in. gauge frontier lines, the Government of India bear in mind the advisability of adapting it for hasty extensions in war time, then no doubt the general principles enumerated above will be complied with; if, however, the question is decided without reference to such requirements, then the construction of locomotive lines in war time will be greatly restricted.

Lines constructed in war time are intended primarily for the transport of stores and supplies, and not, except in emergent cases, of troops. It must be remembered that, while a line is under construction, all the permanent-way material has to be conveyed by it to the rail-head in addition to the ordinary traffic of military supplies. Its capacity will thus be strained to the utmost without carrying troops. Moreover, at the time when the troops are concentrating, the line will not be ready, so everything that has legs of its own to travel on must use them. In special cases when the heat of the climate makes it desirable to rail the troops, and time admits of the start of the expedition being delayed till the railway is ready, troops might be carried on it; also in ordinary cases when the line is completed it may be used to a certain extent to convey small detachments or to move up troops in relief. A few light open-sided passenger cars could be kept for this purpose, though, as a rule, nothing but baggage wagons should run on the line. In the Soudan British troops were sometimes railed in open baggage wagons under the midday sun, and in urgent cases the same could be done on the Indian frontier, a light roof covering or awning being added if necessary. The railway is in reality, however, merely to take the place of the transport carts of animals.

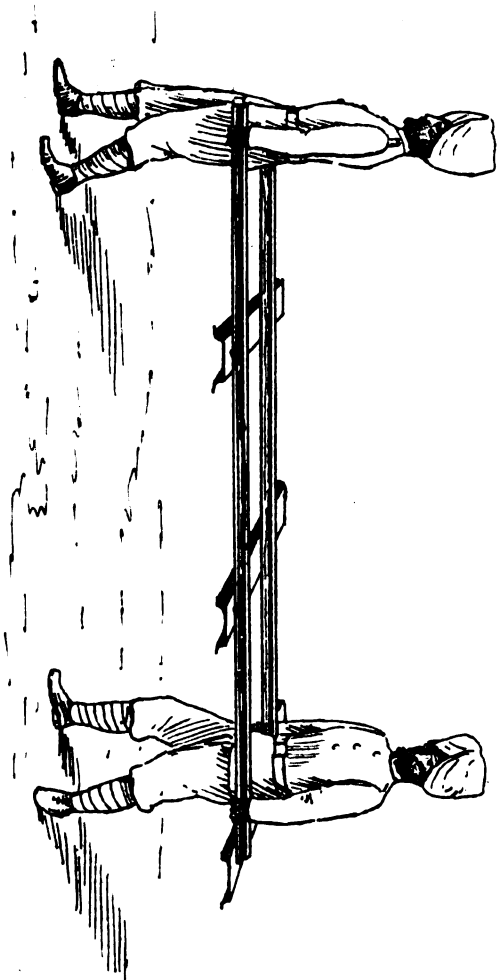
Sick and wounded would of course always be conveyed to the front by railway in specially constructed ambulance cars with good springs. These cars should be capable of being drawn by bullocks on the bullock line and by locomotives on the other line.

In order to lessen the cutting and embankment, gradients and curves must be admitted of greater severity than on permanent lines. It is impossible however to lay down definite rules on these points in the absence of knowledge as to the rolling-stock that will run on them. It may be necessary to impose a ruling gradient of less than 1 in 25, and with light lines 1 in 25 could be admitted in short lengths. Sharp curves should of course not be situated on steep gradients. In necessary in such cases, the gradients must be eased to compensate for the extra friction.

The rails should be attached to steel sleepers in bays of such length that they can be easily handled by two men, and rapidly relaid, the plates being kept fixed to one end. Ballast would not at first be employed except where the nature of the ground rendered it absolutely necessary. Points and crossings would be of the simplest form as provided in ready-made bays.

The necessity for bridging the numerous deep ravines that intersect the border country is likely to lead to delay in construction of the line unless a careful organization is in existence. The most suitable material for hasty bridge construction is timber. Some excellent examples of hasty timber railway bridges are given in the official text-book "Instruction in Military Engineering, Volume I, Part III, Military Bridges," and it is needless to reproduce them here. For a small span the strutted trestle of timber bridge is probably the best, and it would be very desirable to have in stock properly squared timbers for bridges of this nature, of lengths to suit various spans, together with bolts for the joints. If the parts were marked and the railway crew had practice in putting them together in peace time, they might be most rapidly constructed in war. For larger spans trestle bridges are more suitable and in the same way timbers suitable for trestles of various heights could be stocked and practised with. The abutments of such bridges would, in the absence of mortar, often have to be built of dry stone. This requires to be bonded with timber bolts both longitudinal and transverse, to give stability. Timber or stone filled with rough stone packing, makes very strong abutments, and is particularly suitable where stone is inferior in quality.

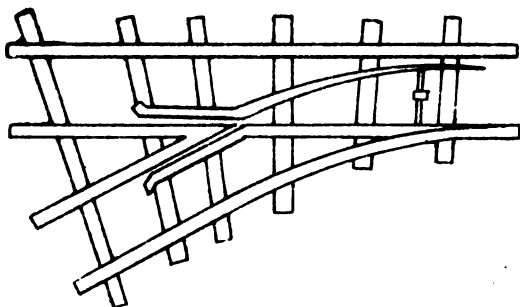
Steel or iron could be made use of for bridges if the materials were kept in stock ready for immediate use. For shorter spans the ordinary rolled I girders would do. For longer bridges lattice girders to suit various spans could be made up in peace time and the parts kept, so that they would only require bolting together on the spot. The railway troops could be trained in putting them together.



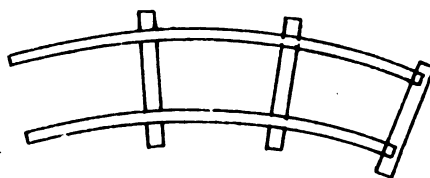
ONE BAY OF LOCOMOTIVE LINE.







**SET OF POINTS IN ONE BAY.**



**CURVED BAY.**

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The writer has seen a published design of an adjustable lattice girder to suit various spans, but is unable to reproduce it or to quote from memory the name of the author. The principle of it was that the distance apart of the upper and lower booms and the angle of inclination of the diagonal members varied according to the span.

It will be seen later, under the head of "Organization and Working of Railway Corps," that it is proposed to have large central workshops at the peace head-quarters of the corps. All bridge-work required in war time, if not already in stock, would be manufactured there and would be fitted, put together, marked, and despatched by rail, either complete, or in lengths convenient for transport, but requiring the minimum of skilled work at the front.

In cases, where the necessity for constructing a bridge would cause delay, a temporary line would be laid down to the nullah and out again on steep gradients for use till the bridge is ready. Extra banking engines might be required in some of these cases to push the loaded train up the ascending grade. Wooden trestling can also be used to fill up gaps where no heavy floods are expected.

The position of stations would depend on the presence of water and to a certain extent on tactical exigencies. From 10 to 12 miles apart would probably be suitable. No time would be lost in erecting station buildings or platforms. Tents or light huts would answer the purpose of the former, and the latter could at first be dispensed with, and as time admitted could be provided later on.

The line being single, the "line clear" system of working, as used on nearly all Indian permanent lines, would presumably be adopted. It should be remembered, however, that on a new and hastily built line it would hardly be safe to run trains at night, and it certainly would be impossible to do so if the country were hostile and the inhabitants in the habit of destroying the track. The traffic, therefore, which will undoubtedly be very heavy, must be confined to the hours of daylight. With the slow speeds which will prevail on these lines it may be impossible to deal with heavy traffic on the "line clear" system if only daylight hours are available, unless either the stations are much closer together than indicated in the last paragraph, or intermediate signal stations between the main stations are provided. The agency by which it is proposed to work the lines when completed will be discussed later. Telegraphic communication between stations would be provided in the usual way by the Government Telegraph Department.

Across the frontier defensive measures to protect the stations and the line would be necessary. In some cases the stations would be within the ordinary defensive posts on the line of communications, and the defences of the post would include the railway station. As a general rule, railway stations, particularly in mountainous countries, are in positions ill-suited for defence. In these cases it is better for the garrison to entrench

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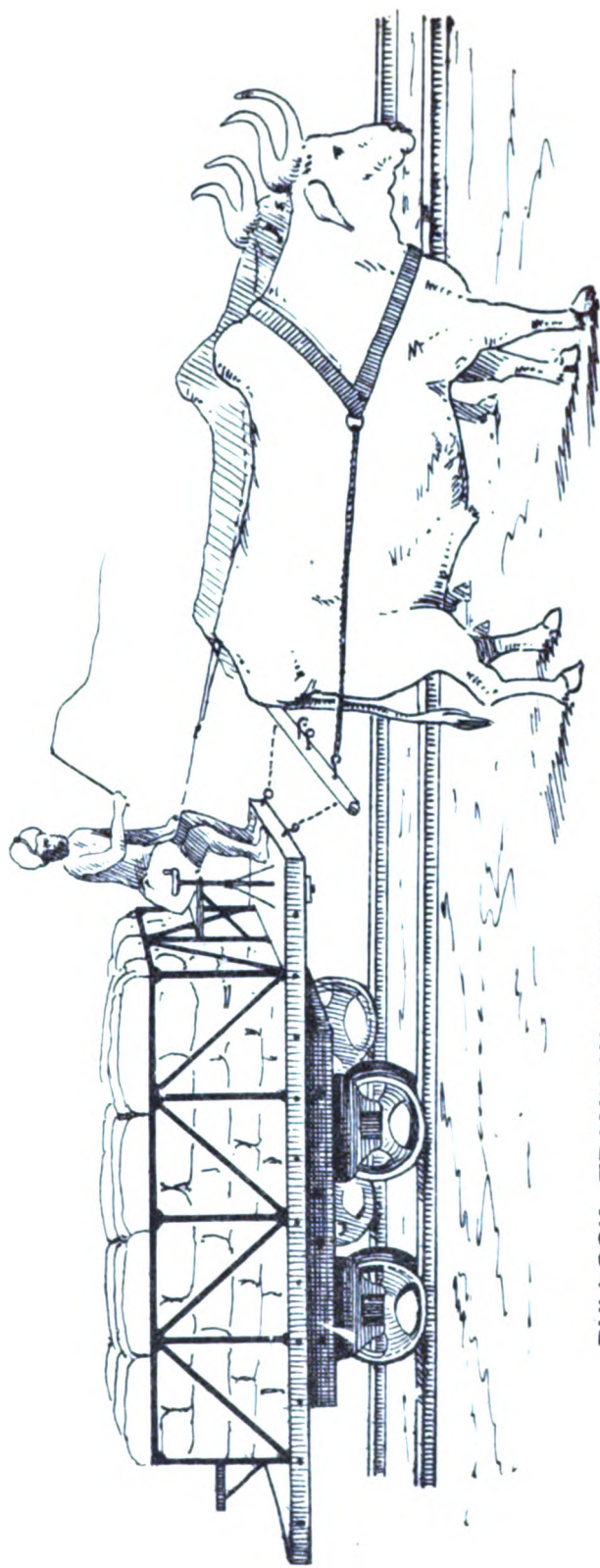
themselves on some hill or other suitable spot which commands the station and its approaches at short range. The railway staff would be withdrawn within the fortified enclosure at night. If the station precincts were kept well lighted up, marauders could be kept from doing any serious damage to the plant or stock. If intermediate stations existed between the main stations, it would be inconvenient to defend them all. It would be better to withdraw the signallers and their instruments by the last train each night and take them out by the first each morning.

As soon as the tribesmen find out how much trouble and inconvenience they can cause by destroying the track, interruptions from this cause may be expected to take place with as much frequency as the cutting of telegraph wires does now. By day the line could be patrolled or picquetted, or a small escort sent with each train. By night it would be impossible to prevent the removal of rails and sleepers. Well organized break-down gangs must be kept at each station to effect repairs, and at daybreak a repair train, accompanied by an infantry guard, should go over the whole line between each pair of stations. The best way to stop this kind of trouble is to bring pressure, political or forcible, upon the neighbouring villages. It might, however, be necessary to construct blockhouses for the protection of specially important bridges.

In order to avoid any delay after the outbreak of war in surveying and locating the line, this should be done, as far as possible, in peace time. All the probable lines of advance of military expeditions are well known, and the parts of them that lie within our borders or in tracts, now occupied by our troops, could be surveyed and the best location for a line fixed and marked by pillars. If political considerations rendered it undesirable to put up pillars, or it was likely that they would be destroyed, accurate plans would enable the line to be identified when required. In the location of the line the necessity for rapid construction should be kept in view. Such surveys would make known what bridges would be required and would admit of the materials being kept in stock and prepared for use.

(b) *Bullock tramway lines*.—The bullock tramway lines would be intended to take the place solely of cart or pack transport for the carriage of supplies and of the sick.

If two tons be accepted as the limiting nett load for one pair of bullocks, then a light open single bogie wagon would be suitable. Though this load is the most which it would be advisable to fix where there are many inclines, yet on stages where the country is perfectly flat much more could be carried. Such tracts exist on the Indian side of the frontier hills, and for these double bogie wagons carrying four tons could be employed. Specially bulky or heavy articles, such as pontoons or siege guns, could be transported on trucks with a larger number of bullocks, though it may be necessary to strengthen the line and bridges for the passage of these.



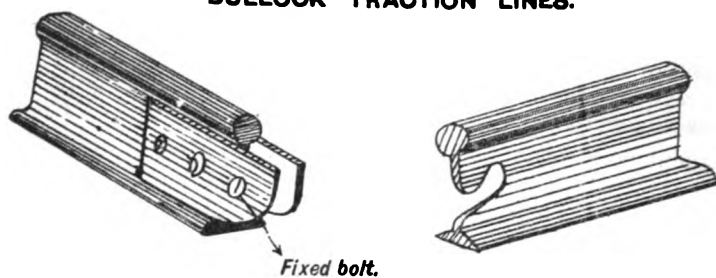
**BULLOCK TRAMWAY WAGON.**







**JOINT FOR RAILS.  
BULLOOK TRACTION LINES.**



**ONE BAY OF LINE FOR BULLOOK TRACTION.**

For the transport of sick specially built double bogie cars with canvas or iron roof covering and canvas sides would be provided. These cars should have good springs and should have couplings to enable them to run on the locomotive lines as well, so that transhipment of the patients would be avoided.

Every wagon must be provided with a seat for the driver and a good brake. The bullocks will have to walk at one side of the track and not in the middle among the sleepers, so the method of yoking must admit of this. Bands round the breast and hump with rope traces would probably be the most suitable form.

A special rapid or express service for the transport of mails and inspecting officers could also be organized with light vehicles and ponies for the tractive power.

The permanent way must be adaptable to inequalities of the ground, capable of rapid laying, and simple.

#### Permanent way.

There should be no question of locomotive trains ever running on it, and even if it were required to convert a bullock line for use with locomotive traction, new rails must be laid. This would in any case be necessary, as the flatter grades and curves required for locomotive lines would generally necessitate a different alignment. The rails should be about 16 lbs. to the yard and of the flat-footed or Vignole's type. They should be kept rivetted to light steel sleepers about 2 ft. 6 in. apart in short bays so as to be easily handled by one man. The joints must be flexible and simple of adjustment, yet strong. The type shewn in the attached illustration is the one adopted in Germany and appears to be a very good one. For curves special curved bays, as described in the Austrian lines above should be provided. These curves might be on a 15 feet radius, and each bay of a length equal to one-sixteenth of the circumference of a circle of that radius. Thus each curve bay would measure 5 ft. 10 in. along its centre line, and would effect a change of direction of  $22\frac{1}{2}$  degrees, and four such bays 90 degrees.

The points and crossings should be of the simplest character. The inclined plane type used on German and Austrian lines, and already described, are somewhat liable to cause accidents; for temporary points the kind known in England as "contractors' points" are simpler, and therefore perhaps more suitable. The principle is that the length next to the branch is removable and can be placed opposite either line; some simple locking bolt should be given to keep them in place. For permanent sidings proper points in made up bays would be used.

No ballast is required for these lines; on roads or on ordinary flat country the bays can be laid and fixed directly without preparation of the ground.

#### Formation.

On hill-sides the preparation of the formation is no more formidable a task than the construction of a road. Where the ground is really soft, brushwood, stones, etc., can be used to make a bed for the sleepers. Small hollows can be filled up in the same way. Earth embankments where necessary should be well rammed or made about one-tenth

higher than necessary to allow for settlement. In soft ground a track for the animals, about three feet wide, requires to be made alongside the rails either with planks or metalling.

The ruling gradient should be 1 in 20, though short lengths of 1 in 15 could be managed. To ascend a mountain side the employment of zigzags and reversing stations might sometimes be most advantageous. But in this case it would be necessary that the wagons should be capable of being drawn with either end leading. As regards the attachment of the bullocks, there would be no difficulty about this, but the driver's seat and brake would be in the wrong place. A seat for a native driver, however, may be a very small ledge or flap on the edge of the wagon, and one could be provided at each end, nor should it be impossible to devise a brake workable from each end.

The bridges for a line of this description would not be different from ordinary road bridges. The road-bearers immediately under the rails might be made with advantage a little stronger than usual, as the short wheel base of the wagons would result in the load being rather concentrated. The usual types of hasty military bridges would be suitable, with the exception of suspension bridges, which should be avoided for these lines unless the locality forbids the use of any other type. Over suspension bridges the wagons would have to be slowly pushed by hand, and this would result in great delay. On pontoon bridges bullock tramway lines, with wagons as described previously, could be used with perfect safety. As in frontier campaigns the absence of timber is the most usual cause of delay in bridge building, a stock of suitable baulks, poles, road-bearers, and chesses would, with advantage, be kept. The preparation of these materials in the head-quarter workshops, as described under the head of Locomotive Lines, would be equally desirable in the case of bridges for bullock lines.

No station arrangements are required; a number of sidings would be given at the Commissariat store-yards, and where Ordnance or Engineer Parks existed, sidings would be led there too.

The system of working the traffic will be described later.

No special measures will be required to defend the stations, as they will always be within the defensive parts of the line of communications. As regards the protection of the line between stations, particularly against destruction of the track, the remarks made under this head in the case of locomotive lines apply also here.

The location of such lines would not be a matter of difficulty. On ordinary ground the rails would just be laid straight ahead. On hill-sides the location would be similar to that of a road, and the line could be rapidly laid out by an officer with a DeLisle Clinometer, which is a most useful instrument for such work.

## THE ORGANIZATION AND WORKING OF RAILWAY CORPS.

The Railway Troops of British and Continental armies are organized for the purpose of carrying out both construction work and traffic management. In the German Army these duties are kept separate, and they have Traffic Companies, Construction Companies, and Workmen Companies, all distinct. The British Royal Engineer Railway Companies, however, are intended to do both works. In India the whole conditions of the public services are very different from those prevailing at home and on the continent. The question of the desirability of providing a railway battalion for Indian warfare is one that has more than once been discussed before, both officially and in the public press. The principal reason which led to the conclusion that such an organization is unnecessary in India is that we already possess, in the State Railway Branch of the Public Works Department, an organization capable of carrying out all railway work required in war, without incurring the additional expense of keeping up a special military establishment in peace time. The railway work done in India in the past in war time, or under threat of war, has consisted in the extension of the standard gauge lines—as, for instance, the Sibi line already alluded to ; also the Bolan and Hurnai lines. The question of hastily constructing light narrow gauge lines to follow the troops up along the lines of communication was not in those days seriously thought of. The conditions, however, which attend the adoption of the latter are different from those of the former. The particular object which it is sought to obtain by the employment of these light lines is the reduction of the great number of transport animals required on long lines of communication. To effect this rapidity of construction is, above all things, imperative.

Now, notwithstanding that the organization of the State Railway Department is admirably adapted for the work it has to do in peace time, and that its personnel is second to none in ability, experience and devotion to duty, still it cannot be denied that rapidity of construction is more likely to be secured by a military organization of disciplined men, trained to act in thorough unison, accustomed to the materials they would have to use, and exercised in the particular work they would have to perform in war, than by civil labour collected together at short notice. Civil labour is liable to strikes (*vide* the Sibi Railway) and to panics, and much time elapses before the men get used to working together and to the materials they must employ. Mr. J. R. Bell is of opinion that \* “a clear month is needed to collect men, and, whether before or after the ostensible start, to get operations into full swing.” In very few, if any, Indian campaigns would it be possible to allow so long a time for the purpose.

Though there are strong grounds for the establishment of a military organization for the construction of war lines, the arguments for providing a military organization not essential.

\* “Repairing and Constructing War Railways.” Lecture delivered by Mr. J. R. Bell, C.E., at the United Service Institution, Simla, and published in the Journal for August 1892.

similar system for the traffic management are far less strong. The working of the proposed bullock traction lines will not involve any thing of a technical nature. Besides the question of the supply of bullocks (which would be a matter for the Transport Department), the only point requiring consideration would be the management of the time-table for the despatch of convoys so as to allow of through transit of loaded wagons and the passing back of empties. The whole arrangement would be most conveniently left in the hands of the Commissariat—Transport Department, who would deal with it as they now do with cart transport. The railway battalion would thus only be charged with the construction and with the maintenance and repair of these lines.

As regards the traffic management of the locomotive lines, it is probable that the State Railway Department of the Public Works Department could deal with it more efficiently than any military organization could. The management of the North-Western Railway have had such excellent practice and have shewn such ability in the concentration of troops and supplies for frontier expeditions that they could probably without difficulty supply a trained staff to work the field lines. With a military organization for this purpose it would be very difficult to impart in peace time the necessary training to enable them to deal successfully with the great stress of traffic that will be thrown on field railways in war. If the traffic section of a railway corps were employed in peace time altogether on the management of one permanent line, then on war supervening the traffic of that permanent line would be dislocated by the sudden removal of the staff. If they were employed singly and separately on different lines, the advantages of a military organization would disappear and reliance might just as well be placed in the ordinary railway staff. In cases where permanent 2 ft. 6 in. lines had been constructed in peace time, then, when hasty extensions were made during war, the management of the latter would be merged in that of the former; in cases where no such lines exist, but 2 ft. 6 in. lines are started in war time from the nearest standard gauge station, then the administration of the latter line would take over the working of the field line as soon as it was ready and would provide the necessary staff.

Although it is proposed to leave the management of field railways (locomotive lines) in the hands of the Civil Railway Department, yet that part of those lines which lie beyond the base would, in ordinary course of things, come under the control of the General of Communications as is laid down in the Field Service Manual, Part XI. The Director of Railways, whose appointment is provided for in paragraph 57 (e) of the above regulations, would control both services, namely, the construction and maintenance of the locomotive and bullock lines by the railway battalion, and the management of the completed lines by the civil staff.

The construction of the line falls into two heads—first, the preparation where necessary of the formation, cuttings, and embankments by unskilled labour; and, secondly, the skilled work, such as plate-laying, bridge-making, etc.

There would be no necessity to include in the ranks of the railway battalion men for the execution of the former of these two kinds of work. Unskilled labour in ample quantities is available in all Indian frontier wars; thousands of Hazara and Pathan coolies can be obtained at short notice for excavation work, and, if highly paid and well supervised, these men make most efficient navvies. In the event of political or other reasons making the employment of Pathan labour undesirable (which is highly improbable), then military labour in the shape of the pioneer battalions, infantry working parties, etc., could be employed. It would be very uneconomical to swell the ranks of the railway battalion with mere diggers.

The actual work which the railway battalion will be required to do is thus narrowed down to the technical part of the construction work, which requires skilled and trained labour, namely, plate-laying, bridging, station arrangements, any works necessary to obtain a supply of water, and defences; the survey and location of the line and the supervision of the unskilled labour employed in preparing the formation will also be carried out by the staff of the railway battalion.

It is assumed that each railway unit, previously and hereafter called for convenience a battalion, should be of a strength sufficient to carry out all the railway construction work required on any one line of the advance; that is, to lay a locomotive line from the rail-head onwards as far as the nature of the country permits and simultaneously to be laying a bullock traction line on ahead with such rapidity as to keep as nearly as possible up with the march of troops. How many such battalions are required for the Indian Army is a question that will be dealt with later. To fix the actual strength and composition of a battalion, it is necessary to enter in detail into a consideration of the work they would have to do.

To take first the bullock tramways. The following general system is the one which it is believed will best secure rapid work in laying the line. The method of constructing bullock traction lines. The bays of permanent way will be loaded on to wagons (the ordinary single bogie goods wagon intended for use on the bullock lines) at the base, and drawn out by bullocks to the rail-head. As each wagon arrives at the rail-head, the bullocks will be unhitched and the wagon will be unloaded, and when empty lifted off the rails so as to leave the line clear. The laying gangs will then take up the bays, one man to each bay, and carry them into their places and joint them up. Lastly, a small gang will straighten the line and pack up under it where necessary. Before laying the line a small gang will level off the formation and fill up small hollows, etc.

To ensure continuous and rapid working, it is best to have sufficient wagons to carry simultaneously all the material required for a day's work, otherwise the work of the laying gangs might be interrupted by reason of the material not being forthcoming. Ten miles per day of 24 hours is the rate of working we should strive to attain, assuming the country to be suitable for a formation already prepared. One

bay, of the pattern described before, 5 feet long, of rails 16 lbs. to the yard, with two sleepers, will weigh about 75 lbs. A wagon will carry 60 such bays, equivalent to 100 yards of line. 176 wagons are required for 10 miles. All the wagons should be loaded the day before and should be conveyed to the rail-head in time to commence work with the laying gangs in the morning. A proportion of curved bays should be included in the wagon loads; the proportion would be determined by the nature of the country. Points would be required at camping-grounds and stations for sidings. When each wagon has been unloaded and lifted off the rails, it would remain there until all the full wagons had passed; it would then be replaced on the lines, the bullocks yoked to, and the wagon sent back to the depôt. As they arrived back there, the wagons would be re-loaded with materials for the next day's work, and a full train of 176 wagons despatched on the night of the first day so as to arrive at the rail-head in time for the first relief on the second morning. It will be seen that more than 176 wagons in all will be required, as many of these that go out on the first morning will not have returned to the depôt in time to be re-loaded and go out again. About 300 wagons will be required in all. This is not many considering the number that will be required to work the supply service on the completed line; but if 300 were not at first available, it would still be possible to work the system with less. A carefully worked out time-table would, in such a case, be required for the despatch of materials, and passing back of the empties.

Day and night working would be necessary to achieve so great a rate of progress as 10 miles a day, and four reliefs would be required for the 24 hours' work. The labour being very arduous, the men should only work two hours at a stretch.

The number of men required to work the above system would be as under, the numbers given being that of one relief:—

	Men.
Loading wagons at depôt (each pair could load 4 wagons in one hour).	4
Unloading wagons at rail-head and lifting off rails ...	12
Lifting empty wagons on to rails ... ..	8
Laying and jointing bays ... ..	30

(In two trips these would lay 60 bays or one wagon load, and a regular rate of progress of  $7\frac{1}{2}$  wagon loads per hour would have to be kept up.)

	Men.
Straightening and packing up line ... ..	6
Levelling formation for laying gang ... ..	6
Total for one relief ... ..	66
Or for four reliefs ... ..	264

To this should be added 10 per cent. for casualties and odd jobs, making 290 in all. There should be one non-commissioned officer in charge of each gang and an officer in charge of each relief.

Where excavation work was required, a large amount of labourers, civil and military, would be employed, and to supervise these it would be necessary to have one or two officers, four or six non-commissioned officers (overseers), and say four men. Besides these, there will be, when the ground is difficult, a locating party to make out the line. It would be composed of one officer, one non-commissioned officer, and about six men.

In addition to the above, there is the bridging work to be provided for. It is impossible to lay down the exact numbers that will be wanted for this, as it depends entirely on the number and nature of the bridges required. It will be best to have a general establishment of artizans and others for all work of this kind, including repairs and workshop work, and to detail the numbers wanted for bridges for each case at the time.

For the construction of the locomotive lines the organization would be very similar to that described above for the bullock lines. The progress would be slower, as the material would be heavier; also the necessity for a truly graded formation and better packing of the line would retard progress. The materials would, in this case, be brought up in trains pushed by locomotives. As the weight of the rails, etc., cannot be definitely fixed (owing, as has been previously stated, to the fact that it must depend to a considerable degree on the description of rolling-stock adopted by Government for the permanent 2 ft. 6 in. gauge lines on the frontier), it is not possible to say how much line can be carried on a wagon. The time-table for the supplying trains must be so arranged that they arrive at the rail-head with sufficient frequency to keep the laying gangs fully supplied. On the arrival of each train it will be entirely unloaded and then will go back to the next station or siding so as to leave the line clear. The weight of the bays of rails will probably be such that two men will be required to handle each. Under these circumstances we may assess the strength of the gang as under :—

	Men.
Loading wagons at dépôt ... ..	8
Unloading trains at rail-head ... ..	12
Laying bays (40 men can only carry 20 bays each trip) ... ..	40
Straightening and packing up line ... ..	16
Total for one relief ... ..	76
Or for four reliefs ... ..	304

Add ten per cent. spare for casualties and odd jobs, making the total 334 men.

D



This does not include ballasting. With light rolling-stock and slow speeds it should be quite possible on the hard soil of the frontier to dispense with ballast at all events at first. For the Sibi line the road bed was prepared by merely ploughing up a width of 100 yards to loosen the earth for the packing gangs. If the campaign was protracted and the traffic heavy, ballast might be provided later, but for rapid construction it is imperative to do without it at first. Where absolutely necessary it could be collected, broken and spread by civil labour.

For supervision of the civil labour employed on earthwork a staff would be required similar to that given for bullock tramways, but the party for staking out the line would have to be stronger owing to the necessity for accurate levelling.

It is desirable to have the drivers, etc., for the material trains part of the battalion so as to have the whole organization under one command. Since the line, as each section was completed, would be taken over and worked by the civil staff, the material dépôt would be moved up, and should thus be never more than 20 or 30 miles behind the rail-head. Four engines are as much as would be required for the material service, so a staff of six drivers, six firemen, and eight signallers would be enough to add to the strength of the battalion for this purpose. These men would be useful in peace time to enable practical instruction to be given and to permit of use being made of these lines at camps of exercise, etc. They would be attached to the workshop section. (See below.)

For bridging work, for repairs to plant and wagons, and for special technical works, such as water-supply, etc., when required, a large staff of skilled artisans and good central workshops are required. An establishment of 60 carpenters, 40 blacksmiths and fitters—the latter including six engine-drivers and firemen,—and 20 masons would be none too many; and to these should be added 80 ordinary unskilled men for carrying and other work. Materials for construction of timber and possibly of iron bridges would be made up in peace time in these workshops, which would be located at the permanent head-quarters of the corps, and the establishment thoroughly practised in putting them together. On the outbreak of war the bridges required, if not known already, would be ascertained by a rapid reconnaissance, and suitable materials with a sufficient number of trained men despatched from the head-quarters under an officer to construct them. To cope with the extra work thrown on the workshops during war, additional civil artisans would be temporarily employed.

From the above résumé of the work that a railway battalion would have to carry out, we can arrive at a suitable strength and composition for it. The numbers given above are for the working parties only, and leave no margin for guards and camp duties, etc.

Allowing for these a railway battalion would be suitably composed of two sub-divisions of 400 men each for laying lines, and a

workshop section of 200, making in all 1,000 men, exclusive of non-commissioned officers. Each of the two sub-divisions would be organized in four companies and would be trained to lay either a locomotive or a bullock line. Each company would furnish one of the four daily reliefs for the construction of either form of line and still have a sufficient number left for other duties and to allow for casualties, etc. Such a battalion would be able to construct two distinct lines simultaneously, namely, either two bullock lines on different lines of advance, or one making a bullock line rapidly ahead and the other altering it into a locomotive gradually from the rear.

The British officers would be drawn from the Royal Engineers, and the following would be a suitable staff on the war scale :—

1	Commandant	...	...	...	Lieutenant-Colonel.
1	Second-in-Command and Superintendent of Instruction	...	...	...	Major.
1	Superintendent of Workshops	...	...	...	Major.
2	Assistants to Superintendent of Workshops	...	...	...	Subalterns.
1	Adjutant	...	...	...	Captain.
1	Quartermaster	...	...	...	Subaltern.
2	Sub-division Commanders	...	...	...	Majors.
16	Sub-division Officers	...	...	...	{ 4 Captains. 12 Subalterns.

In peace time 8 sub-division officers would suffice instead of 16, and no assistants would be required to the Superintendent of Workshops. The additional officers would be added on mobilization, and to ensure that these are trained, a certain number should be attached to the battalion for a few months each winter for that purpose, particularly during camps of exercise, etc.

For interior economy and discipline in the lines native officers would be appointed on the same scale as in infantry regiments.

A British warrant officer and a couple of sergeants would be usefully employed with the Workshop Section, but besides these, no others are necessary or desirable. The position of such men in native corps is a difficult one, particularly in relation to the native officers.

Attached is a statement shewing the total strength of all ranks proposed.

*Statement showing composition and strength of a railway battalion.*

BRITISH OFFICERS.																	BRITISH N. C. OS.		NATIVE OFFICERS.		NATIVE, N. C. OS.		RANK AND FILE.			
WAR ESTABLISHMENT.						PEACE ESTABLISHMENT.						WAR AND PEACE ESTABLISHMENT.														
Lieut.-Cols.	Majors.	Captains.	Subalterns.	Lieut.-Cols.	Majors.	Captains.	Subalterns.	Conductors.	Sergants.	Subdar Major.	Subadars.	Jemadars.	Havildars.	Naiks.	Artizans.	Ordinary pri- vates.	100									
...	...	...	1	...	...	...	1	...	...	...	1	2	6	12	...	...	...									
Strength of one company																	...	...	...	...	...	...	...	...	...	...
<i>Strength of a battalion.</i>																										
...	(a) 1	2	6	...	(a) 1	1	3	...	...	...	4	8	24	48	...	...	400									
...	(a) 1	2	6	...	(a) 1	1	3	...	...	...	4	8	24	48	...	...	400									
...	1	...	2	...	1	...	...	1	2	...	1	2	(d) 12	16	(e) 120	80										
...	1	(b) 1	(c) 1	1	(b) 1	(c) 1	...	...	...	1	1	...	3	...	...	...										
...	1	4	5	15	1	4	3	7	1	2	1	10	18	63	112	120	880									
Total																	...	...	...	...	...	...	...	...	...	...
1st sub-division of 4 companies as above																	...	...	...	...	...	...	...	...	...	...
2nd sub-division of 4 companies as above																	...	...	...	...	...	...	...	...	...	...
Workshop and Bridging Section																	...	...	...	...	...	...	...	...	...	...
Battalion staff																	...	...	...	...	...	...	...	...	...	...

*Total strength.*

(a) Might be Majors or Captains.

(b) Adjutant.

(c) Quartermaster.

(d) Includes 6 engine drivers.

{ 60 carpenters.

{ 34 blacksmiths.

{ 6 firemen for locomotives.

{ 30 masons.

British officers ... 25 (war scale).

British warrant and non-commissioned officers ... 3

Native officers ... 20

Native non-commissioned officers and men ... 1,175

The two sub-divisions for line laying require no artizans or men of technical knowledge, their work being a

**Class of men.**

matter of drill and training. The men should therefore be selected for physical strength and intelligence. Mazbi Sikhs would probably be very suitable, and there must be a large field for recruitment in this direction still open—Punjabi Mahomedans would also do well. The native officers should be of the same class as the men.

For the Workshop Section artizans would be required. The artizan class in India are unwarlike; but as in this case they could be employed exclusively on their handicrafts, this would not matter. In the Northern Punjab excellent carpenters, masons, and blacksmiths are procurable among the Sikhs and Punjabi Hindus. The non-commissioned officers of this section would be men of higher technical training and skill.

The men of the battalion, except the artizans, would be armed with rifles and trained to their use. Their pay would be higher than that of infantry so as to secure good men and to compensate them for their arduous work. The artizans would, in addition, receive working pay at different rates according to their skill. This would have to be fixed on a liberal scale so as to compete successfully against the labour market.

As already shewn, one battalion can work two lines simultaneously.

This would be enough for all ordinary campaigns, even when on a large scale as in 1897. It is evident, however, that in the event of a really great war in Afghanistan two battalions would be necessary.

The selection of head-quarters for the two battalions depends on two conditions. They must be near the frontier and centrally situated as regards their possible theatres of operations so as to enable the men and materials to be speedily railed thither. They must have facilities for thorough practical training in peace time. For one battalion Rawalpindi seems the most suitable centre. It is well situated as regards railway communication with every part of the frontier from the Black Mountain round to Waziristan. The country is diversified and thoroughly suitable for practical training and trials during the cold season. The second battalion would be required in a great war on the Southern or Kandahar line of advance, and Quetta would be a good station for it. Quetta is, however, somewhat out of the way in the event of this battalion being wanted on some other part of the frontier. Sibi or Sukkur are unsuitable by reason partly of the climate and partly of the want of opportunity of practical training with troops. Taken all round probably Lahore would be the best place for it.

Each battalion should be equipped with wagons and permanent

**Materials and equipment.**

way for at least 100 miles of bullock tramway and with 50 miles of permanent way only for locomotive lines. There should also be a

large reserve in the country of materials for both. Half a dozen engines and a hundred goods wagons would be necessary for practice and to enable the line to be made use of for camps of exercise. Bullocks for the lighter line would also be required for a similar purpose.

The training of the battalion should aim at securing above all things smoothness and rapidity of working on service. Continual practice at laying lines and at bridging would be essential.

#### Training.

The conditions under which it is carried out should approximate as nearly as possible to those of active service, and every opportunity should be taken of practically using such lines at the annual winter camps of exercise. As the amount of material to be transported to the front on mobilization would be very great indeed, a good system of loading and entraining would require to be worked out and thoroughly practised.

The employment of the railway troops or their material in peace time on civil works for the pecuniary advantage of Government is not to be encouraged. In times of famine, for instance, their use in conveying supplies to affected districts might be of great assistance. If, however, war broke out while the battalion was employed on famine works, and the line had to be dismantled and the men and materials transported, perhaps from Central India to Peshawar, a most lamentable delay would ensue. The temporary pecuniary advantage to be gained by employing these corps on civil works should weigh as nothing beside their military efficiency. If two battalions were raised, it might be possible to occasionally employ one of them in some such manner, provided the other were always kept ready for instant mobilization. Only a great war could call for the services of both battalions and great wars, like great storms, give long warning.

#### WORKING OF TRAFFIC ON BULLOCK TRACTION LINES.

Though, as has already been stated, it is proposed to leave the management of the bullock traction lines in the hands of the Commissariat—Transport Department, who would also supply the bullocks, a short description of how heavy traffic could be dealt with would not be out of place.

The attached diagram shews the working of a line, 70 miles long, in six stages. The pace is assumed to be  $2\frac{1}{2}$  miles an hour; on stages, however, where the line is flat or the down-grades are in excess of the up-grades, the speed would be greater, and in actual practice time-tables would be worked out to suit circumstances. It will be seen that the full convoys take two days to get up and the empties take four to return. The line being single, the timing of the returning empties has to be arranged so as to avoid meeting the full convoys except at the stages where there are passing sidings. The bullocks are changed at each stage, and in the time-table half an hour is allowed for this and to allow for delays. Actually the change of bullocks would only take a few minutes. Sixteen hours working a day, namely, from 4 A.M. to 8 P.M., are allowed for.



bay, of the pattern described before, 5 feet long, of rails 16 lbs. to the yard, with two sleepers, will weigh about 75 lbs. A wagon will carry 60 such bays, equivalent to 100 yards of line. 176 wagons are required for 10 miles. All the wagons should be loaded the day before and should be conveyed to the rail-head as time to commence work with the laying gangs in the morning. A proportion of curved bays should be included in the wagon loads; the proportion would be determined by the nature of the country. Points would be required at camping-grounds and stations for 2 days. When each wagon has been unloaded and lifted off the rails, it would remain there until all the full wagons had passed; it would then be replaced on the lines, the bullocks yoked to, and the wagon sent back to the dépôt. As they arrived back there, the wagons would be re-loaded with materials for the next day's work, and a full train of 176 wagons despatched on the night of the first day so as to arrive at the rail-head in time for the first relief on the second morning. It will be seen that more than 176 wagons in all will be required, as many of these that go out on the first morning will not have returned to the dépôt in time to be re-loaded and go out again. About 300 wagons will be required in all. This is not many considering the number that will be required to work the supply service on the completed line, but if 300 were not at first available, it would still be possible to work the system with less. A carefully worked out time-table would, in such a case, be required for the despatch of materials, and passing back of the empties.

Day and night working would be necessary to achieve so great a rate of progress as 10 miles a day, and four reliefs would be required for the 24 hours' work. The labour being very arduous, the men should only work two hours at a stretch.

The number of men required to work the above system would be  
Number required for laying, as under, the numbers given being that of one relief:—

	Men
Loading wagons at dépôt (each pair could load 4 wagons in one hour).	4
Unloading wagons at rail-head and lifting off rails ...	12
Lifting empty wagons on to rails ... ..	8
Laying and jointing bays ... ..	30

(In two trips these would lay 60 bays or one wagon load, and a regular rate of progress of 7½ wagon loads per hour would have to be kept up.)

	Men
Straightening and packing up line ... ..	6
Leveling formation for laying gang ... ..	6
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Total for one relief ... ..	66
Or for four reliefs ... ..	264

To this should be added 10 per cent. for casualties and odd jobs, making 290 in all. There should be one non-commissioned officer in charge of each gang and an officer in charge of each relief.

Where excavation work was required, a large amount of labourers, civil and military, would be employed, and to supervise these it would be necessary to have one or two officers, four or six non-commissioned officers (overseers), and say four men. Besides these, there will be, when the ground is difficult, a locating party to make out the line. It would be composed of one officer, one non-commissioned officer, and about six men.

In addition to the above, there is the bridging work to be provided for. It is impossible to lay down the exact numbers that will be wanted for this, as it depends entirely on the number and nature of the bridges required. It will be best to have a general establishment of artizans and others for all work of this kind, including repairs and workshop work, and to detail the numbers wanted for bridges for each case at the time.

For the construction of the locomotive lines the organization would be very similar to that described above for the bullock lines. The progress would be slower, as the material would be heavier; also the necessity for a truly graded formation and better packing of the line would retard progress. The materials would, in this case, be brought up in trains pushed by locomotives. As the weight of the rails, etc., cannot be definitely fixed (owing, as has been previously stated, to the fact that it must depend to a considerable degree on the description of rolling-stock adopted by Government for the permanent 2 ft. 6 in. gauge lines on the frontier), it is not possible to say how much line can be carried on a wagon. The time-table for the supplying trains must be so arranged that they arrive at the rail-head with sufficient frequency to keep the laying gangs fully supplied. On the arrival of each train it will be entirely unloaded and then will go back to the next station or siding so as to leave the line clear. The weight of the bays of rails will probably be such that two men will be required to handle each. Under these circumstances we may assess the strength of the gang as under :—

	Men.
Loading wagons at dépôt ... ..	8
Unloading trains at rail-head ... ..	12
Laying bays (40 men can only carry 20 bays each trip) ...	40
Straightening and packing up line ... ..	16
<hr/>	<hr/>
Total for one relief ... ..	76
Or for four reliefs ... ..	304

Add ten per cent. spare for casualties and odd jobs, making the total 334 men.

D



This does not include ballasting. With light rolling stock and slow speeds it should be quite possible on the hard soil of the Indian road bed was prepared by merely ploughing up a width of 150 yds. to loosen the earth for the packing gangs. If the campaign was protracted and the traffic heavy, ballast might be provided later. For rapid construction it is imperative to do without it at first. When absolutely necessary it could be collected, broken and spread by manual labour.

For supervision of the civil labour employed on earthwork a staff would be required similar to that given for bullock tramways. But the party for staking out the line would have to be stronger owing to the necessity for accurate levelling.

It is desirable to have the drivers, etc., for the material transport part of the battalion so as to have the whole organization under one command. Since the line, as each section was completed, would be taken over and worked by the civil staff, the material depot would be moved up, and should thus be never more than 20 or 30 miles behind the rail-head. Four engines are as much as would be required for the material service, so a staff of six drivers, six firemen and two signallers would be enough to add to the strength of the battalion for this purpose. These men would be useful in peace time to receive practical instruction to be given and to permit of use being made of these lines at camps of exercise, etc. They would be attached to the workshop section. (See below.)

For bridging work, for repairs to plant and wagons, and for special technical works, such as water-supply, etc., when required.

**Workshop and bridging section.**—A large staff of skilled artisans and mechanics. Central workshops are required. A establishment of 60 carpenters, 40 blacksmiths and fitters—the latter including six engine-drivers and firemen,—and 20 masons would be a good number, and to these should be added 80 coolies to be kept at the disposal for carrying and other work. Materials for construction, such as iron possibly of iron bridges would be made up in peace time at the workshops, which would be located at the permanent headquarters of the corps, and the establishment there may prove sufficient for them together. On the outbreak of war the necessary stores, if not known already, would be accumulated by a special commissioning officer with suitable materials with a sufficient number of trained men drawn from the headquarters under an officer to construct them. In addition with the extra work thrown on the workshops during war, a number of civil artisans would be temporarily employed.

From the above résumé of the work that a railway battalion would

Strength and composition have to be given, we can see that a staff of a battalion. Strength and composition of the workshop section are given above are for the working parties only, and do not include the staff for guards and camp followers, etc.

Allowing for the extra work that a railway battalion would be expected to do of two sub-divisions of 40 men each for laying down, and

workshop section of 200, making in all 1,000 men, exclusive of non-commissioned officers. Each of the two sub-divisions would be organized in four companies and would be trained to lay either a locomotive or a bullock line. Each company would furnish one of the four daily reliefs for the construction of either form of line and still have a sufficient number left for other duties and to allow for casualties, etc. Such a battalion would be able to construct two distinct lines simultaneously, namely, either two bullock lines on different lines of advance, or one making a bullock line rapidly ahead and the other altering it into a locomotive gradually from the rear.

The British officers would be drawn from the Royal Engineers, and the following would be a suitable staff on the war scale :—

1	Commandant	...	...	...	Lieutenant-Colonel.
1	Second-in-Command and Superintendent of Instruction	...	...	...	Major.
1	Superintendent of Workshops	...	...	...	Major.
2	Assistants to Superintendent of Workshops	...	...	...	Subalterns.
1	Adjutant	...	...	...	Captain.
1	Quartermaster	...	...	...	Subaltern.
2	Sub-division Commanders	...	...	...	Majors.
16	Sub-division Officers	...	...	...	{ 4 Captains. 12 Subalterns.

In peace time 8 sub-division officers would suffice instead of 16, and no assistants would be required to the Superintendent of Workshops. The additional officers would be added on mobilization, and to ensure that these are trained, a certain number should be attached to the battalion for a few months each winter for that purpose, particularly during camps of exercise, etc.

For interior economy and discipline in the lines native officers would be appointed on the same scale as in infantry regiments.

A British warrant officer and a couple of sergeants would be usefully employed with the Workshop Section, but besides these, no others are necessary or desirable. The position of such men in native corps is a difficult one, particularly in relation to the native officers.

Attached is a statement shewing the total strength of all ranks proposed.

Statement showing composition and strength of a railway battalion.

[illegible]

*Strength of a battalion.*

[illegible]

*T. alstrengi* k.

1. The first of these is the fact that the majority of the population is of African descent, and that the majority of the population is of African descent.

The two sub-divisions for line laying require no artisans or men of technical knowledge, their work being a

**Class of men.**

matter of drill and training. The men should therefore be selected for physical strength and intelligence. Mazbi Sikhs would probably be very suitable, and there must be a large field for recruitment in this direction still open—Punjabi Mahomedans would also do well. The native officers should be of the same class as the men.

For the Workshop Section-artizans would be required. The artizan class in India are unwarlike; but as in this case they could be employed exclusively on their handicrafts, this would not matter. In the Northern Punjab excellent carpenters, masons, and blacksmiths are procurable among the Sikhs and Punjabi Hindus. The non-commissioned officers of this section would be men of higher technical training and skill.

The men of the battalion, except the artisans, would be armed with rifles and trained to their use. Their pay would be higher than that of infantry so as to secure good men and to compensate them for their arduous work. The artisans would, in addition, receive working pay at different rates according to their skill. This would have to be fixed on a liberal scale so as to compete successfully against the labour market.

As already shewn, one battalion can work two lines simultaneously.

**Number of battalions necessary.**

This would be enough for all ordinary campaigns, even when on a large scale as in 1897. It is evident, however, that in the event of a really great war in Afghanistan two battalions would be necessary.

The selection of head-quarters for the two battalions depends on two conditions. They must be near the frontier

**Head-quarters.**

and centrally situated as regards their possible theatres of operations so as to enable the men and materials to be speedily railed thither. They must have facilities for thorough practical training in peace time. For one battalion Rawalpindi seems the most suitable centre. It is well situated as regards railway communication with every part of the frontier from the Black Mountain round to Waziristan. The country is diversified and thoroughly suitable for practical training and trials during the cold season. The second battalion would be required in a great war on the Southern or Kandahar line of advance, and Quetta would be a good station for it. Quetta is, however, somewhat out of the way in the event of this battalion being wanted on some other part of the frontier. Sibi or Sukkur are unsuitable by reason partly of the climate and partly of the want of opportunity of practical training with troops. Taken all round probably Lahore would be the best place for it.

Each battalion should be equipped with wagons and permanent way for at least 100 miles of bullock tramway

**Materials and equipment.**

and with 50 miles of permanent way only for locomotive lines. There should also be a



For the passage of 500 tons of stores, 250 wagons would be required, and for continuous working of this amount daily over six stages altogether 1,500 wagons would be necessary. The limit of the carrying capacity of the line would depend on the number of wagons available. 250 wagons on the line would occupy a length of nearly  $1\frac{1}{2}$  miles, and the tail would arrive in camp half an hour after the head. In the diagram the two lines enclosing the shaded space denote the head and tail respectively of the convoy.

Despatching all the wagons in a single convoy as shewn in the example is preferable to a succession of small convoys at intervals, as the latter arrangement requires a number of sidings along the line to admit of the passing of returning empties. In the latter case, moreover, the timing of the arrivals at the passing stations must be accurate, and with bullocks this is very difficult. The single convoy system is also easier to guard.

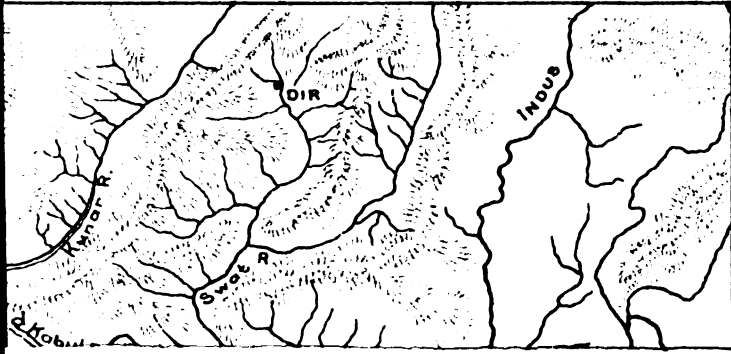
### CONCLUSION.

There are two principal objections which will probably be brought against any proposal to raise special battalions for railway purposes. One of these is that, owing to the great weight of material which it would be necessary to transport to the base of operations on mobilization, delay would ensue and a strain would be thrown on the railways by which troops were concentrating. This objection loses much of its force when it is remembered that instead of the railway materials a vast number of transport animals would have to be railed up to the base. The permanent way material for 50 miles of bullock tramway line of the nature described in the preceding pages would weigh 1,760 tons and could be carried in 176 broad gauge goods wagons, or say six trains. The single bogie wagons and the bullocks to draw them are certainly bulky, and a great number of them would be required, but it must be remembered that by each wagon and pair of bullocks thus transported 2 tons or 56 maunds of stores would afterwards be carried; whereas, if camel transport were used, 11 camels would have to be railed to the base (and from a greater distance) for the same amount of stores. As only four camels can be carried in one broad gauge cattle truck, it is evident that the advantage as regards lightness of transport is greatly in favour of the railway system.

The other objection is on the score of cost. Such an organization as has been herein described, requiring as it does a considerable capital outlay in purchase of plant, and heavy recurring charges in payment of personnel during peace time, would be undeniably costly. The cost of the plant, however, should hardly be taken into consideration; once bought it would last several campaigns, and the expense therefore would be nothing compared to the present system of buying an immense number of animals at very high prices at the beginning of each campaign and selling such of them as survive for a tenth of their cost at the end of it. The recurring charges would be heavy; but, on the other hand, there would be an enormous saving every

campaign on the charges now paid for hiring animals and for the carriage of stores by contract (often at fancy rates) on what is known as the maundage system. The gain in efficiency and in rapidity of transport would be considerable. The indirect advantages which have already been alluded to, namely, the reduction in the strain on the resources of India in the matter of animals and drivers and the lightening of the suffering caused to the Punjab peasantry by the impressment of men and animals, though not measurable directly in rupees, are of sufficient weight to materially add to the balance in favour of a system such as that herein proposed.

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## TACTICAL STUDIES FROM THE AFGHAN WAR OF 1878 TO 1880.

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The Afghan War of 1878 to 1880 lasted so long and the operations spread over so large an area of country that it is necessary to give an outline of the whole before going into the details of the several battles.

The Amir Shere Ali having received a Russian embassy in the early part of 1878, Lord Lytton, who was then Viceroy of India, asked him to receive an English one also. This was refused: on the 21st November 1878 the Government of India declared war, and Afghanistan was invaded by three separate lines, namely, the Bolan Pass leading towards Kandahar, the Kurrum Valley, and the Khyber.

General, afterwards Sir, Donald Stewart commanded the southern line, and on the 8th of January 1879 he entered Kandahar having triumphed over the difficulties of 400 miles of rugged, barren country that separate that city from the Indus. The Afghans offered very little resistance.

The Kurrum force in the centre was led by General Roberts who, marching up that valley, fought the battle of the Peiwar Kotal and established himself strongly at the head of the valley.

The Northern Column under Sir Sam Browne captured the fort of Ali Masjid and, advancing through the Khyber Pass, occupied Gundamak on the direct road to Kabul.

Threatened thus from three directions, the Amir Shere Ali lost heart and fled northwards across the Hindu Kush. He died soon after in Russian territory, and Yakub Khan, his successor, promptly concluded with us the treaty of Gundamak. In this treaty was included a clause which provided for the establishment of a British envoy and suite in Kabul, and this the new Amir was not strong enough to resist. Major Cavagnari, a well known frontier political officer, was selected as our envoy and reached Kabul on July 24th with a small escort furnished by the famous Guides Corps. Trusting implicitly in the Amir, Cavagnari wrote letters full of sanguine hope. All seemed to be going well when, on the 3rd of September, Cavagnari was attacked in his residency, and he and his escort, fighting nobly to the last, were all massacred. On the 5th September orders were issued to General Massy to seize the crest of the Shutar Gardan Pass, and Sir Frederick Roberts, hurrying from Simla whither he had been recalled on special duty, resumed the command.

In spite of the smallness of the force at his disposal, in spite of the fact that the transport in the Kurrum Valley had been dangerously diminished, Sir F. Roberts was soon ready for a dash on Kabul. On 6th October he fought a pitched battle with the Afghans at Charasia, and on the 10th of that month, for the third time in our history, the English flag was flying over the battlements of the Bala Hissar.

Yakub Khan had joined General Roberts some time before, and theoretically our army was now merely supporting his authority. But soon after the feeble Amir voluntarily resigned his Kingdom and was deported to India where he has lived ever since. All remained quiet for some time, but in December 1879 a strong combination of tribesmen defeated our detached brigades in the Chardeh Valley and hemmed in our troops in the Sherpur Cantonment. So far history had repeated itself, and the Afghans hoped to see again the terrible events of the winter of 1841-42. But the Sherpur Cantonments were now held by troops in perfect condition, well housed, well fed, well equipped, and well led. Stores of all kinds had been collected by the forethought of our General, and after ten days of investment, ending in a somewhat feeble assault, the tribal combination broke up. Our troops re-occupied the Bala Hissar, and at the end of 1879 our supremacy was more decided than before.

It is now time to return to Southern Afghanistan. Here, under the strong rule of General Stewart, an almost unbroken peace had reigned; fond of money and busy with the increased trade due to the supplies required by our troops, the people seemed resigned to our rule, and peace was only disturbed by the occasional onslaught of a Ghazi.

Ousted then from Kabul and Kandahar, the malcontents made their head-quarters at Ghazni, and partly for this reason and partly to show that we could go where we liked throughout Afghanistan, it was resolved that Ghazni should be visited. It was at first intended that the Kabul troops should find the column for this expedition, but eventually it was resolved that the fine force that had sat so long in Kandahar under General Stewart should march thence on Kabul, taking Ghazni *en route*. Such a march would enable our officers to survey the important road from Kandahar to Kabul. Accordingly in April 1880 three regiments of cavalry, six of infantry, and four batteries of artillery left Kandahar. From the start the enemy were heard of on our flanks, and to force his way to Ghazni, General Stewart had to fight a stiff battle at Ahmed Khel.

In spite of this opposition General Stewart reached Kabul and assumed the chief command there on the 2nd of May. Here he found negotiations in progress between Sir Lepel Griffin and Abdul Rahman, a grandson of the old Amir, Dost Mahommed. Abdul Rahman had tried before to become Amir, but, being driven out of Afghanistan, had taken refuge with the Russians near Samarkand. The deposition of Yakub Khan revived his hopes; and as we were anxious to hand over the government of Afghanistan to any strong ruler, negotiations proceeded smoothly. Towards the end of July Abdul Rahman was close to Kabul, and all preparations had been made to hand over the Amirship to him when startling news arrived of the disaster at Maiwand, about 50 miles from Kandahar. It had originally been intended to withdraw all our troops from Kabul by the Khyber route; but, on the receipt of this bad news, General Roberts, with ten thousand picked troops, was ordered to march to the relief of Kandahar. Sir Donald Stewart with the remainder of our army withdrew to India by the Khyber, his march being unmolested.

On the departure of its old garrison in April 1880 Kandahar had been occupied by troops drawn chiefly from Bombay under the command of General Primrose. Officers and men were new to the country, and a feeling of unrest soon began to arise. Ghazi attacks became frequent, and about the time that the battle of Ahmed Khel was fought Major Waudby, who was in charge of the road between Chaman and Kandahar, was killed at the post of Dabrai. At the end of June reports reached Kandahar that Ayub Khan had collected a force in Herat and was moving towards us. A brigade was therefore despatched under General Burrows to oppose his advance. This brigade marched as far as the river Helmund, but at this dry season of the year the river was fordable everywhere and gave no line of defence. General Burrows therefore fell back, and on 26th July heard that Ayub was moving by the Maiwand road on Kandahar. He attempted to forestall Ayub by seizing Maiwand; but, before he reached that village, he found himself engaged with the whole of the Afghan army, and by the afternoon of the 27th his force was routed and in full retreat on Kandahar. Here the cantonments were unfortunately not in a state of defence. General Primrose was obliged to abandon them hurriedly and to take refuge within the strong walled city, the citadel of which had luckily always been used for our ordnance and commissariat stores. Early in August our troops were so closely invested within these walls that it was almost impossible to get a messenger or a spy through the cordon that was drawn around them.

Prompt measures were at once taken to recover our prestige and to relieve the beleaguered garrison. On the 9th August the force under Sir Frederick Roberts started from Kabul, and a strong column was also formed from the Quetta side under General Phayre. Sir F. Roberts' seasoned veterans, marching for twenty-one days at 15 miles a day, with only one halt, arrived at Robat within signalling distance of Kandahar on the 28th August, and on the 31st they marched into Kandahar. The same evening a reconnaissance in force revealed the position of Ayub's troops and the fact that they meant to stand and fight. On the 1st of September was fought the toughest pitched battle of the whole war. Ayub's army was utterly dispersed, and all his guns, thirty-six in number, fell into our hands.

This was the end of the fighting, but Kandahar was held by us through the following winter; and it was not till May 1881 that our troops were finally withdrawn from the inhospitable regions of Afghanistan.

### ALI MUSJID.

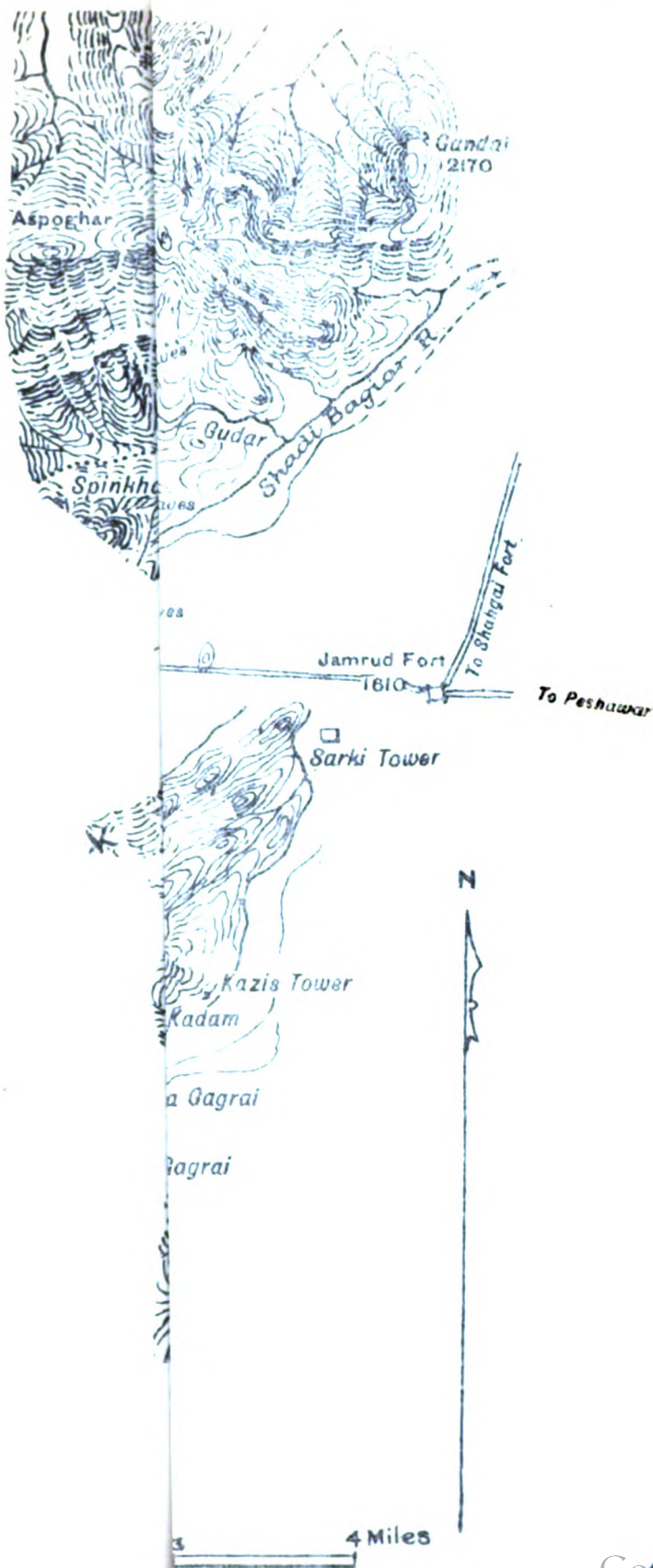
The fort of Ali Musjid, which guards the Khyber Pass, stands on a detached hill, 450 feet in height, rising precipitously from the right bank of the river, 6 miles from the mouth of the pass and 9 from Jamrud. The hills on either side of the fort were entrenched, and fort and entrenchments were held by a garrison of 3,700 men. Seventy-one guns completely covered the approach from the south; and as the pass is here very narrow, the position was very strong against any frontal attack. Its weak point was that it was commanded

by higher ground on the east, the north, and the north-east, and it was on this fact that Sir Sam Browne based his plan of operations. He resolved to send one brigade round by the hills on our right to a position in rear of Ali Musjid, threatening the enemy's line of retreat ; to send a second force working on a line inside that of the first one to menace the position in reverse and on its left flank, while the main body was to move straight up the pass and to attack in front. It was calculated that all would be in position by 1 P.M. on the 21st November, and the battle was then to commence.

At half past five on the evening of the 20th of November 1878 the second brigade under General Tytler, V.C., marched from Jamrud. The column consisted of 640 British and 1,100 native soldiers ; great-coats were carried and one day's cooked rations ; two days' rations followed loaded on bullocks. The night was dark, the road winding, rocky, and broken. About 10-30 Lashora was reached, the column having covered 7 miles only in five hours. Here the troops bivouacked, resuming their march at six the next morning. The road became worse ; and now the column, which had suffered from wet and cold during the night, began to feel the heat and want of water, but the Guides and 1st Sikhs finally reached Kata Kushtia about 4-30 P.M. on the 21st, and in that position they cut the line of the enemy's retreat up the Khyber Pass.

The second column under General Macpherson, C.B., V.C., marched from Jamrud at 2-15 A.M., reaching Lashora at 6-30 just as General Tytler's troops were leaving it. This caused a delay of nearly an hour, and then again the march of Macpherson's brigade was impeded by the bullocks carrying the rations of the leading column, for above Lashora the path runs through a narrow winding ravine. Eventually after great efforts General Macpherson halted about 3 P.M., his men being quite exhausted and unfit for further exertion. In spite of their trials they were not yet within striking distance of Ali Musjid.

The main column under Sir Sam Browne left Jamrud at 9 A.M. on the 21st and marched straight up the pass, reaching Mackesson's bridge at 9-20 A.M. and the Shahgai ridge at 11. The Afghans forced the fighting, their guns opening fire at noon. 1 Battery, C Brigade, Royal Horse Artillery, answered this fire at a range of 2,500 yards, and then advanced nearer the fort, its place being taken by three 40-pr. guns and a field battery. The cannonade on both sides continued without cessation till nightfall. About half past two Sir Sam Browne committed his infantry to the attack. The left attack was made by the third brigade, General Appleyard, the 14th Sikhs leading and was well supported by 1 Battery, C Brigade, Royal Horse Artillery, which pushed up the pass to within 1,200 yards of the fort and did not retire till it had expended the whole of its limber supply of ammunition. The right attack pressed hardily on, well supported by the fire of a mountain battery (11—9 R. A.), but after two hours' fighting it became evident that on this side the assault could not be pushed home. While these attacks were in progress some signs of the first and second brigades and of their turning movements were eagerly looked for, but in vain. The afternoon drew to a close,





the enemy maintained with vigour the defence of their formidable positions. Reluctantly at 5 P.M. the General issued the orders to cease fire and retire. But before these orders reached them General Appleyard's gallant regiments, the 14th Sikhs and the 27th Punjab Infantry, had pushed their attacks well up the steep slopes leading to the Afghan sangars and entrenchments, and in the retirement they suffered severely.

Sir Sam Browne's force bivouacked for the night on the ground it held and prepared at daybreak to continue the battle. The mountain battery advanced and opened fire ; but as the enemy did not reply, the third brigade pressed on and found that fort and entrenchments had been evacuated. Colonel Jenkins, commanding the Guides posted at Kata Kushtia, captured three hundred prisoners on the morning of the 22nd ; others also fell into the hands of various parties of our first and second brigades. No attempt was made by the Afghans to carry off any of their stores, and everything showed that their flight had been most precipitate.

The chief points to be noted in connection with this action are—

- 1st.—The difficulty of timing the movements of troops in intricate hilly country.
- 2nd.—The danger of going on with a frontal attack on a strong position until you know whether your turning movement has developed.
- 3rd.—The necessity of making proper arrangements for covering a withdrawal. The skirmishers of the 14th Sikhs and the 27th Punjab Infantry, who were closely engaged when orders came to retire, lost 36 officers and men killed and wounded while extricating themselves. No counter-stroke or demonstration was made to cover their retirement. Yet, in spite of the tactical errors in execution, the soundness of Sir Sam Browne's original plan was proved by the fact that the Afghans, after beating off our attacks, abandoned a very strong position, merely because they knew some of our troops had gone round to their rear.\*

One more fact remains that is well worth our notice. So marked was the want of all transport arrangement that we find troops, within a few miles of our frontier and near a big station like Peshawar, committed to a night march over terribly difficult ground, and their supplies carried on bullocks with the result that forty-eight hours after leaving Jamrud no rations had reached the Guides, at Kata Kushtia. Out of evil comes good. From lessons such as these sprang our present system of commissariat transport with its thousands of well trained mules complete with saddlery and attendance and capable of ready expansion.

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\*NOTE.—It transpired subsequently that an Afridi Malik who was in Ali Musjid showed the retreating Afghan garrison a road through Afridi territory, thus enabling them to elude Colonel Jenkins and his men who blocked the ordinary line of retreat *via* the Khyber Pass. The Zakka Khel Afridis, however, improved their opportunities and eased the harassed Afghan regulars of some 800 rifle *en route* (Warburton).



## PEIWAR KOTAL.

On the 28th of November 1878 General Roberts reached Habib Kila where he heard that the Amir's troops had abandoned their guns at the foot of the Peiwar Kotal and were in disorderly retreat. He therefore ordered a reconnaissance in force and ascertained that the enemy had by no means retired ; on the contrary, the Afghans were found to hold an extremely strong position on the pass through the hills. This position extended from the Spingawai Kotal on their left to some commanding heights, about a mile south of the Peiwar Kotal, thus presenting a front of 4 miles facing due east, the Peiwar Kotal being about the right centre. Guarding the right like a bastion was an impregnable rock fortress which our people dubbed the Crow's nest. On the left rose a succession of heights crowned with dense forests of pine. The Kotal itself was a narrow depression in the ridge, and the direct road to it, steep, narrow, and rugged was commanded throughout its length by both guns and rifles placed behind breast-works of pine logs and stones. The position was held by 3,500 of the Amir's troops. Seventeen guns frowned from the dark heights and hosts of irregulars hovered close at hand ready to pour down on our flanks and rear should we meet with any reverse.

The next two days were spent in a careful reconnaissance of this formidable position. Keen-sighted officers, escorted by the cunning little Gurkhas, scaled the heights, peered through the dark pine forests, and scanned the enemies' works from every point of view. The most important result of this scrutiny was the discovery that an easy road, practicable for all arms, led up to the Spingawai Kotal ; that the enemy did not hold the Spingawai in force, and that, should our troops succeed in forcing this pass, they could work along the ridge towards the Peiwar crossing a succession of heights. What was most important of all, it was found that the peaks along the ridge dominated each other from north to south. Upon this information the General based his plans. A small containing force was to advance a short way up the main road. Its guns were to bombard the Kotal and the Crow's nest, while a strong column led by the General in person was, under cover of darkness, to work up the road leading to the Spingawai Kotal. Could this be seized, the enemies' position would be turned.

But though this plan was formed, commanding officers alone were trusted with the secret. On the 1st December reconnoitring parties were pushed ostentatiously towards both flanks of the Peiwar position. Batteries were marked out on the plain near the village of Turi. The guns of G-3 and the squadrons of 12th Bengal Cavalry ordered up from Habib Kila manœuvred in full view of the enemy, and troops and followers alike made certain that the main attack would be delivered next morning direct upon the Peiwar Kotal.

Night had fallen before the troops for the turning movement received the orders to fall in. Leaving their tents standing and their fires burning at 10 P.M., they marched silently from the camp. Lord Roberts thus describes the weary night march : " The moonlight lit up the cliffs

on the eastern side of the ravine, but made the darkness more intense under the steep hills on the west beneath which our path lay. A bitterly cold wind rushed down the gorge extremely trying to all, lightly clad as we were in anticipation of the climb before us. Onwards and upwards we toiled, stumbling over boulders, dropping into old water channels, splashing through icy streams, and halting frequently to let the column close up."

The extreme slowness of the march now aroused the General's suspicions. He went to the head of the column to enquire the cause when it was whispered to him that treachery was suspected among the Pathan companies of the leading regiment. Almost at the same moment two rifle shots rang out upon the night air. They were fired as a note of warning to the enemy on the heights above. Luckily no alarm was raised, and just as day was breaking the head of our turning force reached the foot of the Spingawai Kotal. The pale morning light showed a barricade, only fifty yards in front of our leading men. The dashing little Gurkhas at once formed line and led by Major FitzHugh, and Captain Cook rushed straight at the barricade. The enemy now alert fired a volley, but were nearly all bayoneted at their posts. Now the Afghan guns opened from the stockades and sangars above, but the 5th Gurkhas and 72nd Highlanders continued to advance rapidly up the steep side of the Kotal. Three stockades were rushed in quick succession, though obstinately defended. Kelso worked his two mountain guns well to the front in spite of the difficulties of the ground, and by 6-30 A.M. our troops had captured the Spingawai Kotal, and the enemies' defences were completely turned. Here the leading regiments halted, formed up, and re-filled their ammunition pouches, while the General himself pressed forward with the 29th Punjab Infantry towards the main position on the Peiwar.

For nearly a mile they met with no opposition when suddenly the enemy, strongly posted among dense pine woods, opened a heavy fire. In a few minutes the whole of our column was hotly engaged. Hordes of Afghans poured out to defend their threatened flank. On our right was a precipitous hill, deep gullies on our left, and for a time our advance was checked.

Meanwhile the guns of the containing force had at dawn opened fire on the Crow's nest. By 7 A.M. they engaged the Afghan batteries on the Kotal, and for three hours an incessant fire was kept up by the artillery on both sides. The infantry, well sheltered behind a spur, remained waiting their opportunity till 8 A.M. when the flash of the heliograph from the Spingawai Kotal told them that their immediate co-operation was expected. From ridge to ridge they pushed steadily on till about noon they were within 1,400 yards of the top of the pass. From this point long range rifle fire\* was opened on the Kotal, and here the advance halted for the moment.

The 5th Punjab Infantry continued to gain ground to the right front. Their advance on the Kotal itself was stopped by a deep ravine,

\* NOTE.—This was the first occasion on which use was made of the comparatively long range of the Martini-Henry Rifle.

but, following the crest line of the spur, they eventually joined hands with the column under General Roberts at the point where its further progress had been checked.

This was a most important moment in the battle, for the 5th Punjab Infantry were able to show the General a good position, for our mountain guns, and No. 1 Kohat Mountain Battery was soon in action, shelling the Kotal at a range of 1,200 yards. A reconnaissance, however, of the position convinced the General that the Peiwar Kotal was inaccessible from the northern side. He therefore decided on a most masterly movement. Leaving the 2nd Punjab Infantry to hold the ground that had been won and the 29th to protect the field hospital, he withdrew the remainder of his troops from an attempt which promised to be futile and struck boldly at the enemy's line of retreat.

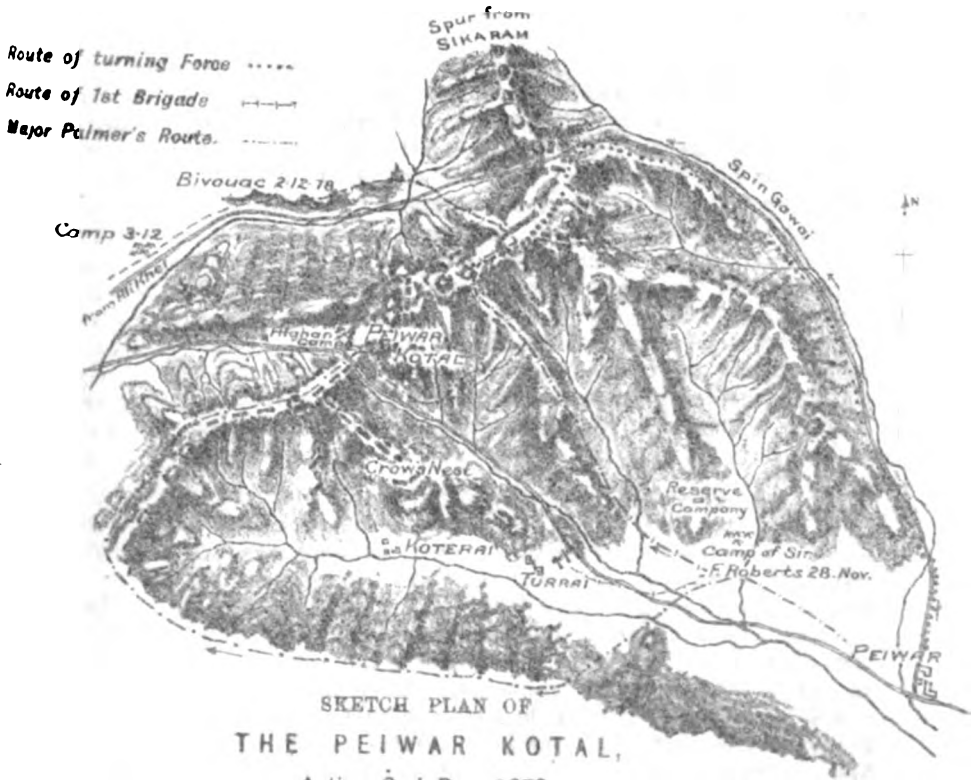
The Afghan camp had been set on fire by the shells of the mountain battery ; the 8th King's had pushed their attack to within 800 yards of the Kotal : worst of all their retreat was threatened. The defence became weaker and weaker. Our men were not slow to perceive this. The guns on the main road, supported by the 12th Bengal Cavalry, moved boldly forward to cover the infantry attack. Two deep ravines still intervened between us and the summit of the pass. Slowly crossing these under a dropping fire, our infantry at length reached the road. Here, protected by a spur, they formed up and then pushed rapidly forward ; and at 2-30 the position was gained, and the enemy in full flight along the Ali Khel road, abandoning their guns, waggons, and baggage. The cavalry managed to come up the very difficult road and pursued for a short distance. The column with which General Roberts was present bivouacked for the night on the cold slopes of the Sika Ram mountain. On reaching the Peiwar Kotal next morning he had the satisfaction of learning that this strong position had been gained with a loss of only 2 officers and 18 men killed, 3 officers and 75 men wounded.

The results of this battle show very clearly the value of a thorough reconnaissance of the enemy's position before troops are committed to an attack. This lesson also is inculcated ; if you make a plan requiring secrecy, confide it to as few people as possible. In the manœuvres of the day before the battle we see likewise how good it is to mix a little cunning with one's valour, for General Roberts undoubtedly succeeded in making the enemy think we were going to attack direct. Such manœuvres have always been considered perfectly fair in war, and it is a great pity the British generally do not study artifices of this nature.

When we come to the actual tactics of the battle, we see the General's guiding idea, namely, to leave a containing force in front of the enemy's main position, while he made a long turning movement



PEIWAR KOTAL FROM BRITISH CAMP.



SKETCH PLAN OF  
THE PEIWAR KOTAL,

Action 2nd Dec. 1878.

Scale  $\frac{1}{2}$  Inch = 1 Mile.

Mile  $\frac{1}{2}$  1 2 3 4 Miles

From Robertson's "Three Campaigns in Afghanistan"



with the remainder of the troops at his disposal. It has been urged that the containing force on this occasion was dangerously small, but Sir Frederick Roberts acted on the assumption that the Afghans, having occupied a strong position, would be loath to quit it for the purpose of making a counter-attack, and he was right.

### CHARASIA.

This battle and the operations immediately before and after it are the most daring and brilliant of those connected with the name of Lord Roberts.

The news of the massacre of Cavagnari at Kabul reached Simla on the night of the 4—5th September 1879. On the 5th the Government of India approved of a recommendation, submitted by the Commander-in-Chief, that an immediate advance should be ordered on Kabul by the Shutar Gardan Pass. The next day Sir F. Roberts left Simla to take command of the troops entrusted with this operation, and by the end of the month he had concentrated at Kushi a force of all arms ready for a dash on Kabul. This was effected in spite of difficulties of transport, greater than the General had ever before experienced. On the 5th October our troops reached the village of Charasia, and cavalry patrols were pushed out along the three roads leading to Kabul. But there were no signs of any large body of Afghans. At day-light next morning the patrols again went out to feel for the enemy, and the General decided to seize the Sangi Nawishta Pass, for by the road through that defile he had resolved to advance on Kabul. But the Afghans had forestalled him, and the morning light showed us the crest line of the hills near the pass, strongly held by masses of regular troops of the hostile army.

The situation was critical. In front towered the steep and rugged heights covered with masses of the savage foe; right and left were numberless villages teeming with a fanatical population ready to pour down upon our camp. From the rear came the news that the brigade under General Macpherson, which was bringing up ammunition and supplies, expected every moment to be attacked. The least indecision, an hour's delay might have been fatal to us. But in the breast of our cool and sagacious commander there beat a heart as resolute as that of Harry Hotspur; out of the nettle danger he determined to pluck the flower safely. Quickly his plans were formed and brilliantly were they executed. All his movements hitherto had led the Afghans to believe that he meant to force the passage of the Sangi Nawishta defile, but that intention was now modified. He determined to turn the Afghan position from their right, sending a small force only to menace the defile.

The position that was now to be attacked was roughly in the form of a horse-shoe extending from the Sangi Nawishta gorge to the heights

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above the villages of the Chardoh valley, a line nearly 3 miles in length. Both sides of the gorge were held as well as a detached hillock to the south of it. Sixteen guns were concentrated in position, chiefly on the heights immediately on the west of the gorge. Here the hills rose to about a thousand feet above the plain, and thence the line extended along the ridge, ending on a rugged, rocky height, nearly 1,800 feet above Charasia. Leaving 700 infantry and 450 cavalry to guard the camp, Sir F. Roberts detached General Baker with 2,000 men and 4 mountain guns to carry out the turning movement from the west. Working up under cover of enclosures near the villages, General Baker advanced to Charasia. A company of the 72nd Highlanders seized a small knoll on the extreme right of the enemy's position from which he opened a heavy fire of musketry.

Reinforcing the company of the 72nd with two companies, Sikh Chakhas, and supporting his attack by the fire of his mountain guns, General Baker extended his infantry and went straight at the right of the Afghan line. The enemy clung obstinately to the ridge which was the key of their position on the right. Reinforcement hurried up to their main body, and for two long hours General Roberts watched anxiously from his camp the progress of the fight.

At length he saw the Afghans waver. The Highlanders and Chakhas on our left were no longer to be denied and had nearly reached the high peak on the enemy's right; by extending his thin line to the utmost, General Baker had managed to overlap the left of the ridge, then, with our supreme effort, the ridge was carried and the Afghans retired, losing heavily under a cross fire.

Meanwhile Major White had been skillfully handling the force entrusted to him for the feint against the Afghan main position near the pass. Three guns of G-3, advancing well to our right, engaged the enemy's guns to the west of the pass, while Major White, with a company of the 92nd carried a small hill on our extreme right. This enabled our guns to press in nearer towards the entrance of the Sangi Nawashta defile, while the gallant Highlanders again pressed on on the outer flank.

And now came the most brilliant tactical movement of the battle. Though he had but two more companies of the 92nd at his disposal, Major White sent them under Captain Oxley towards the Afghan main position. This prevented the enemy from quitting the hills to deliver a counter-attack against General Baker's right, and enabled that officer to follow up the success which he had already gained.

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Our troops had now been hotly engaged for over three hours, but there was plenty of hard work still to be done. Swinging round his left, General Baker now led his men up to and along the main ridge which the enemy abandoned in haste. The ground, however, was very difficult and the progress slow. We can imagine with what mingled feelings the fight was watched from our camp, for not far from General Roberts sat the weak and vacillating Amir. He, Yakub Khan, had lately come from Kabul and joined our troops, and now through the long hours looked on sullenly and with ill-concealed disappointment at the discomfiture of his people. At last the tension was relieved. The mules of the mountain battery appeared on the crest distinctly marked on the sky-line showing that the position was ours. It was nearly dark, however, before General Baker joined hands with Major White, who had meanwhile advanced and captured the enemy's guns. The cavalry followed up the fugitives through the Sangi Nawishta Pass; but as the Logar river here runs through the defile, the ground was not favourable to their action, and the pursuit was soon checked.

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*(To be continued.)*

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# THE USE OF LIGHT RAILWAYS IN INDIAN WARFARE, AND THE ORGANIZATION AND WORKING OF RAIL- WAY CORPS.

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BY CAPTAIN G. LUBBOCK, R.E.

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*Moto: "Parturiunt montes."*

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## PART I.

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### THE USE OF LIGHT RAILWAYS IN INDIAN WARFARE.

It may be well to emphasize at commencement the fact that in this paper railways are only dealt with from India's point of view. Every country must consider the conditions both physical and political under which its wars will be carried on, and adopt such material and organization for its field railways and field railway corps as are most suited thereto.

Continental Powers, whose wars will take place in civilised countries, intersected with existing railways, will have to consider first how to fully utilize and work these as the principal channels of supply to their main armies, while such light railways as they actually construct in war will probably be but adjuncts to these larger lines, either to serve smaller armies acting off the main line of advance, or as branch systems round a beleaguered town to supply war material for siege operations.

England, who has to provide for wars beyond the seas, and is little likely to find railways in the invaded country, has less need for large organizations to work existing lines, but must be prepared to construct and work whatever railways she needs, probably as an entirely separate system with only sea communication in rear over which everything necessary must be transported, and where reliance cannot be placed on parent railways for a single item.

India's railways, unlike those of European States, are not coterminous with those of any other power, and she has no need at present to provide large railway corps for the repair and working of the railways of an invaded country, and unlike England she has not to provide for constructing railways over the seas (for such cases may be excluded from the term "Indian warfare"); her army is an army of defence, and for defensive operations military railways, if needed at all, will generally be built beforehand, while the few instances, when she may be obliged to assume the offensive, can be more or less foreseen, and the organization of military railways is rendered so much the easier thereby.

Generally speaking, all railways in war are but lines of communication, but in type of material and method of organization they may be divided into three classes:—

- 1st.—Those forming the lines of communication of the main army with its base, and branch lines of communication serving smaller forces acting upon objectives at some distance from the main line of advance, which will not necessarily come within the sphere of active operations, and seldom under fire of the enemy.
- 2nd.—Short branch systems of the main line to supply war matériel for siege operations, which may be carried into the very batteries and trenches of the attack.
- 3rd.—Similar systems for the defence of large fortified positions differing from the above only in this respect that they will probably be built, if at all, in peace time.

In uncivilized countries, with a savage enemy, the two latter classes are not likely to be required, and here in India, though neither the enemy nor the country may be uncivilized, the possible use of siege railways is limited to a few definite instances. The few fortified positions in India that may have to be defended against a civilized power and the inner lines of communication they may require can be far better and probably as cheaply served by extensions of the broad gauge system. Siege attack operations on a large scale are not likely to be conducted inside India, and if ever they are conducted beyond her frontiers, it will be in localities devoid of existing railways, and the gauge and the capacity of siege lines will be governed by that of the railways constructed as lines of communication which therefore demand first consideration. In any case the use of siege railways of attack by India is a remote contingency: their working is a subject which demands separate consideration, and they will not be dealt with here.

There is no need to dilate here on the advantages of railways of whatever sort for the supply of an army. Every writer on the subject, and the experience of all modern wars has demonstrated their immense use in operations of any size, in the larger ones their absolute indispensability. But everyone naturally deals with the special needs and conditions of his own country, and in India it has been sometimes assumed that what can be done elsewhere can be done here, and that in railways, as occasionally in other matters, we have only to copy our European neighbours. The time and expense required for the construction of light railways, and their powers, when built, have occasionally been incorrectly estimated, and the conclusion as to their use so far as India is concerned have been consequently at times optimistic. This, be it understood, applies only to railways constructed during a campaign; only such lines are dealt with in the following pages: lines, that is, whose necessity cannot be foreseen or which though foreseen are barred by political or financial considerations from being constructed in peace time. If, however, it is shewn that physical difficulties will often preclude light railways from being usefully constructed during a campaign, the right conclusion will be, it is hoped, not that their assistance should be renounced, but every

endeavour should be made beforehand to provide suitable means of railway transport in places (and there are not a few) where its necessity can be foreseen. The nature of railway, whether light tram line or substantial broad gauge, will be governed by the strategical and financial considerations of each particular case.

In order, therefore, to form an idea of their rôle in Indian warfare, it is necessary to have some understanding as to—

*1st.*—When will 2' 6" gauge railways become useful on the simple grounds of economy?

For, though in most cases economy will only be one among other and greater advantages, on occasions of lesser importance, there will be seldom any object in building railways when animal transport is cheaper and can easily be obtained.

*and.*—At what point, if at all, will they become inadequate, and larger lines become necessary?

in both cases under such conditions as are likely in India.

Between these limits their proper use will lie; and further, time being of first importance, some idea of the rate with which they can be built under various conditions is necessary; we do not want to build railways which will only be ready in time to bring back the returning troops.

#### ECONOMY.

It may occasionally happen that a railway once laid to meet the immediate needs of a campaign will afterwards remain a fixture; in such cases the economy resulting to the particular occasion for which it was built can easily be reckoned. But when there is nothing to justify its working after the campaign is over, the rails and other plant will have to be dismantled and again stored for use on future occasions. In such cases it is difficult to make a fair comparative estimate of the cost of a military railway, even knowing the conditions, since, so far as any one campaign is concerned, the cost of the plant, one of the main items of expense, will depend on its total life, and the amount of use that has been got out of it during that period. Still, in order to shew what a railway will cost under certain given conditions, it may be assumed, as being not very far from the mark, that the plant will last 25 years, during which time it will be used on three or four occasions, and that a small expedition pays, as its share, four years' interest and sinking fund charges on the original cost. Taking, then, for a definite example, such conditions as have been actually found in recent campaigns, it will be assumed that a force of three infantry brigades has to be fed over an average of ten stages from its base on the nearest railway; that, of these ten stages, the first four are in open and comparatively flat country, through which a railway can be easily laid, though it could be carried no further in the time available owing to the nature of the country beyond; it will further be assumed that at the commencement the force is supplied by mule transport over the last six, and by camels or bullocks over the first four, stages.

These details, which at first sight might seem irrelevant, are described simply to shew in the following paragraphs how many considerations there are which all affect in different ways the relative economy of railway and other transport.

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These details, which at first sight might seem irrelevant, are described simply to shew in the following paragraphs how many considerations there are which all affect in different ways the relative economy of railway and other transport.

The daily requirements of three brigades will amount approximately to 1,500 maunds (*vide* Appendix 1) if fodder is not obtainable for the brigade transport. Calculating by the table in Appendix 50 of the Commissariat—Transport Code, we find that there will be required, to supply this force over six stages,  $\frac{1,500 \times 9,773}{1,000} = 14,659$  animals of 2 maunds each; to these 1,500 maunds must be added 5 lbs. per day for the food and grain of these latter animals and their drivers; and the total daily supplies, passing the fourth stage, becomes 2,416 maunds; but, in these calculations, no allowance has been made for the fodder of the animals on the line of communication, and it will be reasonable to suppose that, by the time the railway has reached the fourth stage, the fuel and fodder on the line of communication have been partially exhausted, necessitating an additional daily supply of fodder for about 3,600 animals, and thereby increasing the supply necessary, at the fourth stage, to 3,000 maunds daily, while in the meantime the roads have been sufficiently improved to admit of the camels being moved up on to the advanced stages to meet the increased demand.

To keep up a daily supply of 3,000 maunds at the fourth stage would require 5,700 camels (Appendix 50, Commissariat—Transport Code).

Omitting the cost of the establishment necessary for their supervision, and assuming the total cost of each animal at Rs. 20 per month, the total monthly cost of camel transport over the first four stages would amount to Rs. 1,14,000.

What would be the cost of its transport by rail?

If the distance by rail were 48 miles up to the fourth stage, the railway might be assumed as 50 miles long, allowing for its greater curvature, and the ruling gradient may be assumed as 1 in 50, the best that can be hoped for in most cases.

Now the first thing to be decided is, whether we are to have a mere tramway, sufficient to carry the 110 tons (3,000 maunds) needed in this particular instance, or a light railway capable of meeting, when required, the demands of a larger force. The 2' 6" gauge has been selected, it is believed, as the standard for military lines, not as being the best in each individual instance, but because it best suits average requirements. Were we to select the best line for a daily delivery of 110 tons, the choice would undoubtedly be the 2' gauge, or even a smaller one, with its greater flexibility of alignment and consequent gain of speed in construction, and its lighter though not (see footnote) less expensive rolling-stock. But there is no use in discussing here the much vexed question of gauge: we can only afford to have a limited amount of material for all contingencies, and equally with the gauge, that type of material must be selected that will oftenest be of use. Definite cases can be foreseen where a certain amount of comparatively heavy material may be needed; but for purposes, such as we are now

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NOTE.—Though a 2' 0" gauge bogie may cost less than a 2' 6", the total cost of sufficient rolling-stock to lift a given quantity of stores differs little for either gauge: in Appendix 6 is given a comparison of three modern types of 2' 0" and 2' 6" wagons; it shows that the cost of sufficient stock to lift 100 tons of grain, etc., is rather more for the smaller gauge.

considering, a line that will carry some 200 or 300 tons daily, on a 1 in 50 gradient, seems most suitable. Moreover, it will be obviously economical if we can rely on other 2' 6" lines, whether military or commercial, for reserves of rolling-stock; to have a line so light as to render unsafe the use of such stock upon it, would be to isolate the line as much as if it were of 2' gauge and would defeat the object of adopting the 2' 6" as the standard for both military and commercial lines. No 2' 6" lines in India have rails lighter than 25 lbs. per yard, while the majority have 30 lbs. and 35 lbs., so that on these grounds a 25 lbs. rail seems the lightest advisable.

Setting aside cost, as of minor importance compared to speed of construction, lighter material still has been advocated as being assumed to be quicker to lay; this assumption is wrong; speed of construction will be gone into later at greater length, and it will be shewn that it depends chiefly on gauge, but that other things being equal a 25 lbs. rail takes no longer to lay than one of 15 lbs.; in fact, the advantage in this respect usually will be on the side of the heavier rail.

In the following example it will therefore be assumed that the rails weigh 25 lbs. per yard, and that an engine of moderate power can haul on the line a train of a gross weight of about 66 tons in addition to its own weight at 10 miles an hour. Bogie trucks of modern construction, such as are now used on the Nowshera-Dargai railway, weigh 4·5 tons and carry about 6·5 tons of military stores bulking about 100 cubic feet to the ton, it being remembered that in these cases bulk and not weight is almost always the limiting factor. Each train will therefore consist of six trucks carrying about 39 tons, and we should require to deliver 110 tons, three trains daily. To maintain this traffic there would be required at least four engines and six complete trains of vehicles—36 vehicles, to which a certain amount must be added for emergencies. The cost of the plant for such a line would vary considerably according to the prices ruling in the home market and according to whether it was purchased in a hurry or not, but at the present rates, the estimate given in Appendix 2 is probably a fair one. The cost of the road for the rails is still more problematical; under normal circumstances it is probable that existing cart-roads will not be available, and that a certain amount of embankments, cutting, and light bridging will be necessary; more than this is improbable; for where the country is such as to necessitate heavy works, the time available will probably render it impracticable to build a line at all. Other works may therefore be estimated as follows:—

	Rs.
Preparing the railway and constructing small bridges, 50 miles, at Rs. 4,000 per mile ... ..	2,00,000
Laying the line, 52½ miles, at Rs. 300 ... ..	15,750
Engine sheds and temporary quarters at base ... ..	15,000
Do. at three intermediate stations and terminus ... ..	10,000
Erection of watering arrangements, signals, etc. ... ..	10,000
Total ... ..	2,50,000
Contingencies at 5 per cent. ... ..	12,500
Total cost of works other than plant ... ..	2,63,250

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The cost of the telegraph line is omitted from the comparison since the line would be laid in any case whether railway or animal transport were used and would serve the needs of either. As to the cost of working this line from statistics of Indian railway (*vide* Appendix 3), we may assume that the monthly cost will be approximately as follows :—

	Rs.
Maintenance of 50 miles at Rs. 100 per mile per month ...	5,000
Train mileage, 100 miles $\times$ 3 trains $\times$ 30 days, 9,000 train miles, at Re. 1 per mile ...	9,000
Total monthly cost of working ...	<u>14,000</u>

This omits the cost of engineer officers for supervising, etc., which may be set off against the establishment necessary to supervise the animal transport.

After five months' working of either, the comparative cost of railway and animals will therefore stand as follows ;—

*Animal transport.*

	Rs.
114,000 $\times$ 5 months ...	5,70,000

*Railway transport.*

Construction ...	2,63,200
Working 14,000 $\times$ 5 ...	70,000
Dismantling at Rs. 150 per mile ...	7,500
Sinking fund and interest charges at $3\frac{1}{2}$ per cent. for 4 years on 860,000 ( <i>i.e.</i> , 6 per cent. per annum) ...	<u>2,06,400</u>
Total cost of railway ...	<u>5,47,100</u>

that is, about Rs. 20,000 in favor of the railway on the five months' working, about Rs. 1,20,000 after six months, and an additional lakh for every month after that, so that after a year's working the whole cost of the plant will have been recouped.

The assumptions made are possibly favourable to the animal transport. Were the expedition to last over five months, were the line of communication longer, and were no fodder at all obtainable beyond the base, the advantage of the railway would be still greater ; moreover, the estimate of the cost of animal transport is probably below the mark ; transport officers will probably agree that, including the cost of carrying a camel to the front, equipping it and its driver with the necessary gear, and perhaps feeding them both during the campaign, his cost may considerably exceed Rs. 20 a month.

But from all this it is obvious that, where so many considerations affect the comparative cost, it is impossible to lay down any definite rule as to when the use of railways will be economical ; it can only be said that in certain circumstances it would be economical to lay a

line behind a force of even less than three brigades, and that, generally speaking, the use of light railways will prove economical in any but the most insignificant expeditions, so long as the country admits of their being quickly laid.

In such small expeditions light lines worked by animal or even manual power have occasionally been advocated, but the economy and advantage seem doubtful; for larger expeditions we must have rails of at least 25 lbs. per yard; and as we cannot afford to keep separate stock for each emergency, but must use the same in all cases, the charges for permanent-way will be the same as before even were animal traction employed. The saving on engines and their accommodation will amount to some Rs. 1,50,000; but it must be remembered that the speed of animals will not be more than a quarter of that of the engine, and therefore the wagon stock must be largely increased—so largely that a total increase in the cost of rolling-stock must be expected, and may be set off against possible economy in construction, due to it being possible to lay a rougher and more sharply curved road. The question therefore resolves itself into a comparison of the expense in working. We require sufficient animals to move 3,000 maunds nett load 50 miles per day, equivalent to 12,000 maunds 12½ miles, that is, one stage a day. In a paper by Major Ferrier, K.E., in the United Service Institution of India Journal of January 1897, is quoted a carefully worked comparison by Mr. J. R. Bell, M.I.C.E., between animal traction on roads and tramlines. There is not space here to go into his arguments, but accepting his conclusions that the advantage of traction on rails over that on ordinary roads may be taken at about 2 to 1 in an up and down country, a bullock whose allotted load is 5 maunds on the ordinary road will draw 10 on a tramway; we therefore require 1,200 bullocks to move 12,000 maunds one stage, *i.e.*, a total of 2,400 for up and down convoys. Assuming a bullock to cost only Rs. 10 per month, the monthly cost of working by animals will still be Rs. 10,000 greater than the cost of working by steam, and so far as economy is concerned, there therefore seems little advantage in animal traction. In the opening stages of construction it may be of some advantage to push on a roughly laid line to be worked by animals, when sharp curves, rivers, or other obstacles prevent engines from passing beyond a certain point; but as will be shewn later, the speed of plate-laying will be seriously affected thereby, and it will be advisable, as soon as possible, to get the whole line fit to be worked by steam power.

Nor is it likely, even supposing the heavier rail were not required for larger expeditions, that any great economy will be effected in the instances we have taken, by using a lighter and less substantial line, with permanent-way weighing, say, two-thirds of that in the above instance and proportionately cheaper.

For practically the only item on which any great saving will result is the permanent-way. Axle-loads would have to be greatly decreased and train-loads at least halved, thereby necessitating more wagons and far more engines to haul a given quantity of stores daily, so that the total saving on plant will not amount to much. Little, if any,

reduction can be expected on construction works, while, on the other hand, working expenses will be increased almost proportionately to the increased train mileage. Working out the cost of such a line in the same manner as before, to do the same work, it can easily be shewn that the saving on interest and sinking fund charges will be almost, if not altogether, balanced by the increased working expenses. And for this saving, if saving there be, is paid the penalty of having a line, whose powers are capable of very small expansion to meet larger demands, and whose needs in rolling-stock or as far as engines at any rate, it would be practically impossible to supplement from any other line in India.

It may certainly happen that, beyond the obstacles which limit the 2' 6" lines in rear, country will again be found where light lines are possible, but where they must be for ever isolated, or isolated so long from the lines in rear that the use of locomotives on them will be out of the question. In such cases the aid of steam having been renounced, weight of rail ceases to be of the same importance and the lightest and most portable description of rail can be used, however great the traffic the line is intended to carry. Also, being thus isolated, uniformity of gauge ceases to be essential to these lines, and for many reasons the 2' 0" or even the 18" gauge with its greater flexibility of alignment will be preferable. Whether such lines will be of use in India sufficiently often to warrant the outlay on the necessary plant seems rather doubtful.

An example will serve to shew their advantages and disadvantages.

Suppose, for instance, that beyond the steam worked 2' 6" lines lies a stretch of country for 3 marches impassable for either railway or tramway, but that beyond this again are about four marches (50 miles) over which a tramway can be laid, with adverse gradients between 1 in 25 and 1 in 50. If 60 tons daily are to be delivered at the end of these four marches, about 700 five-maund animals per stage will be required, or about 3,000 animals in all. On Mr. Bell's assumptions the efficiency of the tram on these gradients varies between 2·3 to 1 and 1·8 to 1 compared to a fair road, and the ultimate saving in transport may be taken at about 1,500 animals. Against this saving the disadvantages must be weighed.

The weight of a tram line of the lightest description (say 12½ lbs. rails) may be estimated as follows :—

				Tons.
Permanent-way, 50 miles, at 37·5 tons per mile	...			1,875
Rolling-stock to lift 60 tons on each of four stages + returning empties	...	...	...	240
Construction stores	...	...	...	35
				<hr/>
Total	...			2,150

In order to complete these 50 miles in a month, that is, to deliver the material at the rate of 70 tons per day, 800 camels per stage will be required over the three intervening stages, and 400 animals per stage

over an average of two stages on the tram. That is to say, about 3,200 animals will be entirely occupied for one month on this work alone ; in addition to this, the carrying capacity of the 2' 6" line in rear is reduced by 70 tons daily for the same period, and extra animal transport may be needed to supplement it. There is also the original cost of the tramway to be considered, which will be between 4 and 4½ lakhs.

It has been assumed, of course, that were the tram not laid, a road would be constructed, and the labour in making the road is therefore set off against that in laying the tram.

The advisability of constructing a tramway under conditions like this can only be decided after weighing these advantages and disadvantages, and with a knowledge of other local circumstances. It may be absolutely impossible at the time to spare 3,200 animals for the purpose ; it seems likely that in many cases the ultimate saving will not compensate for the original cost and the transport employed in its construction.

#### CARRYING CAPACITY.

In considering the limiting capacity of 2' 6" lines, we must again have regard to the probable conditions and nature of the country to be traversed. Were the country open, the gradients not over 1 in 100, and the permanent-way rather heavier than in the previous instance, a fairly powerful engine could haul a train carrying about 100 tons of military stores at 8 or 10 miles an hour ; and if crossing stations, water-supply, and rolling-stock were sufficient, there is no reason why 12 such trains, or even more, should not travel in one direction during the 24 hours on a single line, giving a total delivery of 1,200 tons daily—an amount probably in excess of the wants of any army that is ever likely to operate from a single base, and which it would be practically impossible to carry away by animal transport if the army were operating at any distance beyond the rail-head.

But is it likely that the above conditions will be found in the larger theatres of war ?

India's land frontier is bounded from east to west by immense mountain ranges, pierced here and there by passes, the easiest of which are steep to a railway, and in the future, as in the past, it is in or beyond these mountains that her largest armies will probably operate ; we must, therefore, take the physical conditions as we are likely to find them. One exception there is, at Chaman, where our railway system is already through the hills and the country is more or less open beyond ; here the conditions, so far as is known, more nearly approach those described above, and a light railway would probably be equal to any demand that might be made on it ; though, even here, the large reserve of broad gauge material maintained, leads one to suppose that the sufficiency of a light line is doubted. But elsewhere our broad gauge lines stop short of the hills, and it is in continuation of these lines that light railways will be mostly wanted to serve armies acting beyond the frontier. The Bolan and the Khyber are both examples of the probable difficulties. On the former with a great deal of labour and a vast expenditure of money it has

only been possible to get a line with gradients varying from 1 in 55 to 1 in 25; the conditions in the Khyber are much the same, and will probably be very similar in other places where light railways may be wanted. We may therefore take, as typical of the conditions to be met, a section of some 30 miles of ascent on gradients varying from 1 in 25 to 1 in 50, followed by a second section of less steep descent; the whole in broken, rocky, and roadless country where fuel will probably be unobtainable and water scanty. Assuming that only a single line can be constructed in such a country in the time available, we require to determine first—the capacity and, secondly, the number of trains that can be run daily.

The former is governed by—

- (1) the weight and strength of the rail and the sharpness of the curvature, which will govern
- (2) the permissible weight and power of the engine; and
- (3) the weight and capacity of the rolling-stock.

The latter is dependent on—

- (4) whether trains can run during the whole 24 hours or only during day-light;
- (5) the number of crossing stations;
- (6) the facilities at base and terminus for loading, unloading, and despatching stores.

(1) Speed of construction being of first importance, one is at first tempted to select the type of rail and material that is lightest and easiest to handle.

But given sufficient labour, the rate of plate-laying is not much influenced by weight of material, and except on grounds of economy, which we are not now considering, lightness is not therefore all important. Even if it did give some increased speed in laying, under the circumstances we are now considering the advantage would probably disappear altogether, since it will be the rate of construction of the roadway and not of the plate-laying that will rule the advance of the line. This rate is, of course, entirely problematical and will depend on the country traversed and the obstacles to be met, but in a hilly country it will mainly depend on the curvature permissible, enabling obstacles to be avoided; here again we have to weigh speed of construction against the ultimate power of the line, since sharper curves and rapid construction mean engines of shorter wheel base and consequently less tractive power, lighter train loads, and less total carrying capacity.

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NOTE.—For the standard dimensions of light railways for commercial purposes the Government of India recommend curves of 200' minimum radius, with a maximum fixed wheel base of 8' 6", allowing curves of 100' in specially difficult places. But this, of course, is for permanent commercial lines where, besides absolute safety, economy in working has to be considered. In the stress and hurry of war some risks must be taken, and we must expect to knock the permanent way and rolling-stock about in a manner that would scandalize the Chief Engineer of any well conducted commercial line; a wheel base of 6' 3" with curves of 70' radius therefore seem not too much to expect when the line is first being laid; the sharper curves would gradually be eased afterwards.

But even with curves of a minimum of 70' radius, the very least that is consistent with reasonable engine power, a rate of 1 to 2 miles is probably as much as can be expected, and whether the rails weigh 25 or 55 lbs. per yard, this much can easily be accomplished. So that, having decided on the relative urgency of speed of construction and ultimate carrying power, and fixed the sharpest curvature, we can design as powerful an engine as is compatible with such curves and design the rails to suit, without any necessity, beyond economy, for stinting their weight.

(2) A discussion of what loads engines might be theoretically designed to haul under such conditions is beyond the scope of this paper. In Appendix 4 details are given of certain narrow gauge engines of modern type in actual use. Few, if any, of these were designed for such low speed, sharp curves, or general conditions of road as those we are now considering. Probably an engine of the type lately imported for the Nowshera-Dargai railway with certain minor modifications would be most suitable. An engine of this type (*vide* No. 2 of Appendix 4) could draw a train of about 50 tons besides its own weight up grades of 1 in 25 and round 100' curves or even sharper ones at a pinch at about 8 miles an hour, two such engines, a train of about 100 tons gross weight.

(3) Of this gross weight, the actual weight of stores carried will depend on the amount that can be packed into a wagon; from the data given in Appendix 1 it will be seen that the daily stores required for a division of all arms with normal transport have an average bulk of 126 cubic feet per ton. This average bulk will be less if fodder, the lightest and most extensive item, is obtainable in the locality, more if the transport on a long line of communication, on which none is available, has to be fed. Taking the average bulk at 120 cubic feet per ton, the carrying capacity and details of a modern wagon would be as follows: the weights and dimensions are those of the bogies and four-wheel wagons just supplied to the Nowshera-Dargai railway:—

Nowshera-Dargai railway stock.	Weight of wagon.	INSIDE DIMENSIONS		CARRYING CAPACITY IN TONS.			
		Length.	Breadth.	Maximum.	Grain at 70 c. ft. per ton.	Fodder at 170 c. ft. per ton.	Average stores at 120 c. ft. per ton.
	Tons.			Tons.	Tons.	Tons.	Tons.
8-wheel bogies with low sides ...	4'5	25'	6' 8"	11'5	9'5	3'9	5'55
4-wheel wagons with low sides ...	2'5	13'	6' 8"	5'5	4'9	2'0	2'88

There must, of course, be a limit to the height to which it is safe to load such wagons; in the above table 4' is taken as the average height

to which it is safe to load them, considering that they will have to run over sharp curves and possibly a rough road; the maximum load is that which the axles will carry and would be applicable only to loads of ammunition and heavy ordnance stores.

Each single engine train of 50 tons total weight will therefore carry 27·5 tons of stores of average bulk.\*

(4) Daily number of trains. If, as is probable, the surrounding inhabitants are hostile and there is danger of the line being tampered with, night running will be out of the question; but even in a friendly district its feasibility is extremely doubtful; on the ghât sections of the Sind-Peshin Railway, broad gauge lines built as substantially as possible, it is not considered safe. On a light, hurriedly constructed line the danger would be still greater, and the consequences of any great loss or damage to rolling-stock or permanent-way might involve such serious delays that it would probably be anyhow advisable to confine running to day-light.

(5) Theoretically the more crossing stations there are the more trains can run; practically it will not always be possible to find room for sidings just where they are wanted: probably 3 miles will be the average distance, so that there will be nine crossing stations on the 30 miles section.

This would enable the staff of every two out of three stations to concentrate at the centre station of the 3 at night, taking with them their telegraph instruments after the last train had crossed that station, so that great dispersion and consequent weakening the force on the line of communications would be avoided as far as possible; permanent posts need then only be kept at 9-mile intervals, and would practically become coincident in most cases with the road posts, since it is not to be expected that the road traffic will cease altogether when the line is opened.

(6) The loading and unloading, though a matter of demanding considerable forethought in the arrangement of sidings in connection with broad gauge lines in rear, and well organized labour, is a matter that should never limit the capacity of the line. It need only be remarked that without such arrangement and organization the capacity of the line will be seriously crippled.

With only twelve hours for running, and with nine crossing stations on the section, on the whole it is doubtful whether more than twelve trains per day or even as much could be run in each direction, and the total capacity of the ghât section will only therefore be  $27\cdot5 \times 12 = 330$  tons, or if double engine trains are run about 660 tons; but from this we must deduct the fuel, water, and stores required for the line itself, which would probably take a train a day more, if a second section of railway beyond has to be supplied; so that we can only rely on placing

\* NORG.—The proportion of net load to gross weight is such an important consideration in the carrying capacity that figures are given in Appendix 5 to shew that the above is not an unfair assumption; in the present instance, assuming that all trains return empty, the proportion out to  $\frac{1}{2\cdot63}$  which is rather favourable when it is remembered that no commercial lines are so badly off as to have half their goods trains empty.

about 600 tons of stores of all sorts daily at the head of the ghât section, that is, if the traffic is run daily without a hitch—a rather optimistic view to take under the circumstances—while the amount would not exceed 730 tons even though only the heavier loads, such as grain, are carried.

And to maintain even this traffic over a short 30-mile section there would be required—

$$12 \text{ trains} \times \left\{ \begin{array}{l} 2 \text{ engines} \\ 10 \text{ bogies} \end{array} \right\} = \left\{ \begin{array}{l} 24 \text{ engines,} \\ 120 \text{ bogies,} \end{array} \right.$$

adding 50 per cent. of engines and 75 per cent. bogies for stock not returned till next day, the total stock becomes 36 engines and 210 bogies without allowing any margin for spare stock; this represents some 16 lakhs worth of stock which must either be kept in reserve or available somewhere if the ghât section is to be worked to its full capacity.

At first sight 600 tons seem ample for any army acting on a single line of communications that India is ever likely to put into the field. But two divisions alone may want 500 tons daily in food, grain-fodder, etc. (*vide* Appendix 1), and if to this we add the supplies required for the men and animals on any extended line of communication, the increased quantities of ammunition, medical and engineering stores required during active operations, even this margin of power disappears.

Granting that these requirements are possible, it seems obviously unsafe to rely on a single 2' 6" gauge line to supply a large army operating beyond the frontier hills; it is equally obvious that without a railway of some sort the difficulty in conducting such operations would be enormously increased, if even possible, since a simple calculation shews that the amount of animal transport required for even 600 tons daily is so enormous as to be practically out of the question for a single road even if it could be obtained at all in India. The logical conclusion is that under such circumstances neither animal transport nor light railway will by itself suffice.

#### SPEED OF CONSTRUCTION.

It remains to consider the most important consideration of all, speed of construction. In a country without physical difficulties, where the line could advance as fast as the rails can be laid, it would be merely a question of plate-laying, requiring organized labour and a convenient type of material. Given such labour, we require material that can be most easily delivered at rail-head, linked in position, and levelled and packed.

For speedy linking the joints should be as few as possible, and the attachment of rails to sleepers must be simple. The bogie trucks being 25' long, a rail of 26' will be the longest practicable considering what has been said above; any form of sleeper which requires the rails to be gaged and spiked is out of the question; the type of steel

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sleeper in general use on Indian railways seems most suitable; any unskilled labourer with half an hour's practice can drive the two keys which secure the rails true to gauge and by sending out the rails from the base with a pair of fish-plates loosely secured to one end of each, the linking of the joints, the only operation which must be consecutive and on which only a limited number of men can be employed, could be done at the rate of a pair of joints per half minute when the men have had a little practice, giving a speed of 1,040 yards an hour, or about  $3\frac{1}{4}$  miles in six hours' shift, that is, 7 miles a day if two reliefs are working.\*

(3) The packing and levelling is chiefly a question of having sufficient labour and that labour trained. At least 10 cubic feet of earth per yard will be required, possibly more if the road has been somewhat roughly formed, so that a man will probably not do more than two yards of filling and packing in an hour; that is, 150 men per mile, or 525 men per shift would be required to keep up the rate of  $3\frac{1}{4}$  miles of plate-laying.

That is to say, 7 miles a day might be laid if the material could be delivered at rail-head, which unfortunately is extremely improbable; for, as we have seen, a wagon will only carry a load of some  $11\frac{1}{2}$  tons equivalent to 265 yards of track; and if train loads are limited to 6 wagons, *i.e.*, 66 tons of material and 27 tons of dead weight which is the utmost that can be expected on a 1 in 50 gradient, each train will only carry 1,590 yards of track. On a line in working order and complete with terminal facilities it is improbable, as we have seen that more than 12 trains a day could be run, and it does not seem likely that more than 8 could be run in the initial stages when no terminal sidings exist and when working arrangements can hardly be expected to be complete. But even allowing these 8 trains, is it to be supposed that the General Officer Commanding seeing a growing line of railway in his rear will be content to make no use of it†; there must be some give and take between the needs of the railway and those of the army in front, but even granted the greater urgency of pushing on the railway it seems only too probable that urgently required stores will be continually pushed up over it, so that it will only be possible to expect five trains a day for construction purposes. Of these probably one will have to be devoted to the supply of tools, stores, food, and water for the construction gangs, so that four trains a day of material, that is, 6,360 yards, about  $3\frac{1}{4}$  miles of track will be as much as can be expected, and this only on the assumption that sufficient rolling-stock is available.

\* NOTE.—As shewing that this much is certainly possible, the following extract from an account of the Ruk-Sibi plate-laying in 1879 is quoted (*vide* page 293 of Volume LXI of Pros. Inst. C. E.)—"Great care was taken in training the linking gangs, and in selecting the smartest men for this work. Eventually two pairs of rails could be linked per minute, whereas during the first week of plate-laying it took two minutes to link one pair." The material used was chiefly old, of 60 and 68 lbs. section; with new 25 lbs. rails even faster work might be expected.

† NOTE.—A case in point may be quoted, *vide* the account of the Ruk-Sibi plate-laying already alluded to (page 287, Volume LXI, Pros. Ins. C. E.)—"When to this is added first the vexatious delay to material trains caused by the sudden opening of the line for military traffic to Jacobabad..... It can easily be understood that progress for a considerable time was very slow."

It comes to this that, though a good type of material will facilitate the laying and reduce the labour required, the supply of material at rail-head will be the governing factor in the rate of progress, and under favourable circumstances 3 or  $3\frac{1}{2}$  miles a day is as much as we can expect. The truth of what was before stated, *vis.*, that within certain limits weight of material does not much affect the speed of plate-laying is now evident. For with a heavier rail more powerful engines and consequently proportionately greater train-loads are possible, and the same length of line can still be delivered by each train.

As the type of material known as the "Décauville" from the name of the French firm by whom it is chiefly manufactured has occasionally been advocated for field railways, it may be worth while, before passing on, to show why this type\* of material is to be avoided, though it no doubt has its advantages where only short light tramways are wanted, and where every labourer is a consideration. It has already been shewn that rails of 25 lbs. to the yard are the lightest advisable; a line of such rails with steel sleepers, weighing 35 lbs. each at 30" intervals, would weigh 92 lbs. per yard, so that bays 10' long, weighing about 300 lbs., would be the longest that could be loaded and unloaded and carried with any ease; 2' 6" sleepers would not be over 4' long, and the bays can therefore be packed in the trucks with the sleepers on end: the depth of rail and sleeper being about 6", 18 lengths of 10', weighing 2.5 tons, *i.e.*, 60 yards of track will go into a 25' bogie, making the weight of truck and load about 7 tons; if train loads are limited to 39 tons, as before, that is, 13 bogie loads, each train can only bring up 780 yards of track, and the day's work, if four trains a day at rail-head is the limit, will be limited to 3,120 yards, that is, about  $1\frac{1}{4}$  miles a day against  $3\frac{1}{2}$  which might be done with more suitable material. This material has several other drawbacks; owing to its non-flexibility, specially bent sections must be used on sharp curves and the bending would give endless labour at rail-head, since it would be impossible for the despatching officer at the base always to know what curvature was to be laid at any particular point. Besides this, owing to the necessity of having each length of a portable weight, the number of joints to be fished is more than double that of ordinary material, and extra labour with reduced progress would be the result.

The Décauville Company claim, among other advantages, that by rivetting the rails to the sleepers a safer and more cheaply maintained road is obtained, and that with given axle-loads a line can be safely used 25 per cent. lighter than would be possible, were the rails only keyed or spiked to the sleepers. These advantages are open to doubt, but be they what they may, they are outweighed in the present case by the disadvantages already alluded to.

So much for the theory. But before the rails can be laid the road must be constructed; a road, it is true, only some 8' wide, but with limited grades and limited curves. Nine-tenths of Indian warfare is in

\* NOTE.—The particular type having the rails rivetted to the sleepers in complete bays is here referred to: M. M. Décauville make many other types of light lines of course, besides this.

uncivilised country, where the only roads are mere mule-tracks, where nullahs will have to be bridged, cuttings made here, and banks there, and where time may be required to find even a possible alignment. The speed in such cases will be mainly a question of labour available. A certain amount of work can be saved by having plenty of bridging material and trestles in stock; cuttings must occasionally be faced; but the difficulties of embankments and bridging can be largely reduced by having a liberal supply of light steel trestle work and girders of different spans. A small ravine to be crossed might necessitate a 15' bank which would take perhaps four or five days to complete, while light trestles of simple construction could be put up in five or six hours with a tenth of the labour; this should be a most essential item of any field railway plant, far more important in fact than the details of a rail joint or a sleeper attachment. Time can also be saved at commencement by having some knowledge of the obstacles ahead and the route to be followed. With the best materials and organization time will be lost if ten or fifteen days are wasted in preliminary reconnaissances of the first 20 or 30 miles in order to discover a practicable route before anything beyond the base sidings can be laid.

It has been shewn what are the governing factors in the plate-laying itself, but the fact is that it is not the plate-laying at all which, in India, will govern the rate of progress of the line; certain details in the type of material should be kept in mind, but the general inference will be, it is hoped, that good, sound permanent-way should not be given up for light so-called portable material, because a perfectly sound line, and one as heavy as can possibly be needed, can be laid far faster than the road to lay it on can be constructed.

Any generalisation as to the rate of construction that could be attained in such cases as we have been considering would be quite futile, but the most sanguine of practical engineers, who has seen anything of the frontier between Quetta and Peshawar, will hardly assert that a rate of 3 or 4 miles a day is anywhere possible in this district at any rate; one mile or even less will generally be nearer the mark. Where even this much is not possible, it will be a question to be decided on the merits of each particular case whether it is worth while building a railway at all; even with the facts at hand, there will generally be differences of opinion, since even then the time and labour available may not be accurately foreseen. European powers, it may be argued, rely on the use of light railways in countries that are neither flat nor devoid of obstacles; why should we be debarred from doing so? In most European theatres of war there would be good roads on which light lines could be laid without difficulty, and bridges of sufficient strength to carry them over rivers of any size. While in all but the most mountainous parts the lie of the country is not such as to preclude reasonable gradients. In Indian theatres of war neither roads nor bridges can be expected, while in nine cases out of ten the very steepest gradients must be encountered and the efficiency of light railways will be proportionately reduced. The present Commander-in-Chief, then Sir Garnet Wolseley, speaking in the year 1878, said—"But the great question in all military

structures like railways is time—time and material. I do not think it would be possible in a military sense, that is, during a campaign, to make the great cuttings that are required in all other systems of railway. We all know the campaigns of the present day are rapid and must be carried out very quickly. If you have good roads in a country, you can lay down an ordinary system of railway or a tramway, and my friend, Mr. Shaw, has, I know, a plan for rapidly laying a temporary railway under these conditions ..... but with all respect to his invention I think that, in order to lay down a railway after his pattern, it would be absolutely necessary you should have good roads to operate on." Lord Wolseley's remarks applied to India with due allowance for the improvements in railway appliances of the last 20 years mean that the time available and the obstacles to be encountered must be thoroughly reckoned before embarking in the construction of railways in war.

The occasion alluded to was in 1878 at the Royal United Service Institution after a rather acrimonious discussion on a paper which had just been read by a Mr. Haddan on the single rail system—a system which in the last 20 years has not revolutionised railways as its supporters then hoped it would. Mr. Shaw's system alluded to was apparently much the same as the light railways of to-day. A special feature of his engines was that they had a winding arrangement and a supply of wire rope; the idea being that ascents should be concentrated in a few steep and short inclines; the engine having gone to the top of the incline was to be secured to the rails, and haul the train up piecemeal; a description of them is given by Colonel Maquay, R.E., in Volume 8 of the Prof. Papers of the Royal Engineer. The invention has its disadvantages; it would appear far better to save weight on the engine and have a separate steam hoist at each incline; it is unlikely that many opportunities would occur for thus concentrating steep ascents, though the idea of doing so is undoubtedly sound.

The conclusion so far arrived at as regards economy, capacity, and time may be briefly recapitulated as follows:—

- (1) in open country and under favourable conditions light railways will be useful and economical even in small campaigns, when three or even two brigades are in the field;
- (2) but their capacity in hilly country is so reduced that it will not be wise to rely on them to supply a large force, two divisions and their line of communications being probably as much as they can safely be expected to serve;
- (3) in any but open country the time available may render their construction in war out of the question.

And under the most favourable circumstances they cannot be expected to keep up with an army's advance, and the carriage of troops must be considered no part of their normal duty. The fact is that Indian warfare is usually conducted in countries as unsuited for the rapid construction of light railways as they can possibly be. Admitting that it will seldom be possible to construct them with

advantage during active operations, it seems wisest to adopt the policy of constructing them whenever possible in time of peace, when their rôle will be to serve our advanced posts on the frontier, bringing places at present isolated within easy supporting distance of the larger cantonments.

The construction of the line from Nowshera to Dargai is one instance, and several other favourable places doubtless exist where similar lines could be built with advantage; and if this policy is followed up, the necessity for constructing light railways during Indian campaigns will gradually grow smaller and smaller. Still, unforeseen contingencies will arise and must be guarded against, extend our systems in peace how we will, while at present, at any rate, we have also to provide for the too well foreseen contingency when British troops may again have to advance from Chaman and Landi Kotal, but for whose future support we are debarred by political reasons from providing railway communication beforehand.

And even were it impossible that light railways would ever be needed in any other instance, the interests at stake in that one case may be so great that for it alone the provision of a certain amount of railway plant seems more than justified. On what will be our southern line of communication some provision already exists, and from what is known of the difficulties to be met, it seems reasonable to expect that a broad gauge line, such as is proposed, could be built at reasonable speed, though here also the advantages of a light line that could be laid on ahead of the more slowly advancing broad gauge are obvious.

But further north we may be called on to put a force into the field of such size that, without railway communications, it will be impossible to maintain it there; and for this at present we have no provision whatever. After what has been said, it is certainly doubtful whether a narrow gauge line will altogether suffice. But in face of difficulties to be met in this locality, it is out of the question to expect to build a broad or even a metre gauge line except after considerable time, and it seems folly to renounce the aid of a light line that could carry some 400 tons daily, simply because by itself it may not prove sufficient. It would at all events afford immense relief to the animal transport, and would render possible what might otherwise be impossible.

A change in the present policy of the ruler of Afghanistan may result one day in the construction during peace time of those extensions of our Indian strategic lines without which we cannot be in an assured position to give the Amir speedy and substantial assistance against dissension from within, or aggression from without, his dominions—extensions which have been advocated before now by writers on the Afghan question as being both a safeguard in war and a civilizing influence in peace.\*

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\* "Russia in Central Asia." By the Honourable G. Curzon, page 273: also "Imperial Defence." By Sir C. Dilke and Spenser Wilkinson, pages 162 and 168. The former author is referring mainly to the northern line; the latter to both the northern and southern lines.

But for the present the most we can do is to have the materials ready for a temporary line to be laid on emergency and to be followed up by the broad gauge as quickly as possible.

If it is admitted that this is the foremost contingency to be kept in view, India's primary requirements of stock and material seem very clearly indicated. It has been shewn that even with fairly substantial material, weighing about 35 lbs. per yard, a 2' 6" line may not be equal to all requirements; that a lighter rail has little, if any, advantage in speed of construction in the localities where it will have to be laid, and that the increased supply of rolling-stock necessary, and other considerations may render even its economy doubtful.

The necessary amount of material of a substantial type and rails of not less than 35 lbs. per yard should therefore be ranked as first among India's needs in the way of plant. If this is not sufficient for all probable requirements, a certain amount of lighter material of about 25 lbs. per yard or 12½ lbs. tramway plant will no doubt be useful in cases such as those described in the earlier pages of this paper when discussing the economy of light lines; but such material should be recognised as second only in order of importance.

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## PART II.

### THE CONSTRUCTION AND WORKING OF LIGHT RAILWAYS.

The following pages deal only with the organization required for constructing and working new railways in time of war, and not with larger schemes such as have been advocated for working our frontier and strategic lines by a military corps; nor is it proposed to deal with the equally pressing necessity for reinforcing in war time the organization of the principal lines on which the stress of mobilisation will fall, nor with the still greater need for safeguarding the railways of India in times of internal disaffection.

The last two questions concern only broad gauge lines and are not within the scope of this paper.

The first is, to a certain extent, connected with the extension of lines in war. A scheme of this sort was sketched out by Lieutenant Yate in the United Service Institution of India Journal (Volume XV) in the year 1887; but, though it is believed to have been the outcome of several years' discussion, yet, after the lapse of several years, we are now no nearer its attainment; and, even admitting the need of some such scheme, in the form then proposed, it undoubtedly had many drawbacks. It had in view not only the obvious necessity of safeguarding our frontier lines during disturbances both within and beyond the border, but also the provision of an organization for extending these lines in time of war. What strikes one as a disadvantage in the latter part of the scheme, is that those frontier lines, which it was proposed to work by a military corps, are the very lines on which the greatest stress of traffic will fall on mobilisation; and if they are to be worked at all economically in time of peace, they will

require reinforcing rather than depleting in time of war; the men who have had experience of their working in peace will be the very men that will be wanted at such times, and to draft these men away for new extensions and fill their places with men without experience of the locality seems to be a dangerous policy. Such frontier corps might, of course, be made large enough to meet both requirements were expense no object, but such is unfortunately not the case, and we must look to other sources to supply most economically our needs, leaving the defence of our main frontier lines to be dealt with independently. Lest the following pages should appear to contradict the above lines it is emphasized that only the main lines, the main channels of mobilisation are referred to above. Between these and the light frontier railways, from which it is proposed to form the nucleus of the railway corps, there is a considerable difference—a difference of kind, not merely of degree.

But before going further into these sources of supply, it is necessary to know exactly what is wanted. It has already been pointed out that the working of the lines of an invaded country at present form no part of an Indian railway corps; and it may be premised that a hundred or perhaps 200 miles of railway is the very most that is likely under present circumstances to be built during war time, while the requirements of an average campaign will be considerably less; it is proposed therefore to sketch out the construction and working of a 50-mile 2' 6" line, and such an organization as could be expanded in case of need, to work about 100 miles of railway.

#### THE CONSTRUCTION OF THE LINE.

Though it will generally be best that the officers and supervising staff should be military men, under the orders of the General Officer Commanding, it will usually be possible and often advisable to get the bulk of the work done by civil labour. With good pay and proper protection, the Indian cooly of the right stamp will go almost anywhere and under fair treatment is capable of much. Where he can be employed without danger, it will generally be best to do so, and so set free the troops for their proper duties; in fact, it will seldom be possible to spare enough troops to execute works of any size, nor advisable to attempt such works unless cooly labour is forthcoming; such labour has been largely employed on road-making in almost every Indian frontier campaign and can similarly be counted on in nine cases out of ten for the bulk of the labour required for making railways. Could the new road from Dargai over the Malakand to Chakdarra, for instance, have been executed in the time it was, during the campaign of 1895, or any of the heavier works that have been carried out during frontier campaigns, without the plentiful supply of cooly labour that has always been available?

Still, at times, the state of the country may render it impossible or inadvisable to use civil labour; in cases of urgency time may be wasted at the start in collecting such labour, and there ought to be some organization to fall back on. Omitting the numbers required

for the earth-work, grading, and bridging, which are of course entirely problematical, we require a force of about seven officers and 1,000 non-commissioned officers and men as a minimum, while including the men required for these works some thousands may be required, and on grounds of economy alone, the maintenance of so large a force or even of the minimum required, solely as a railway corps, seems to be out of the question, if existing resources can possibly be made to suffice.

If it is considered worth while paying for a railway battalion after the continental pattern, the thing is simple enough; otherwise India's wants must be met in the cheapest manner possible, and existing organizations must be made the fullest use of.

Nor, so far as construction is concerned, does any new organization appear necessary, when we already have officers and non-commissioned officers always employed in peace time on state railways to supply the supervision, and the large resources of railway labour continually employed on the construction of new railways at the services of the State Railway Department; while, if for any reason these resources fail us, we can fall back on sappers and miners, pioneers, and infantry regiments whose training already gives them the various degrees of skill required in railway construction.

The following estimate, practically a table of working parties, shews in detail each operation in construction, as far as it can be foreseen, and how the whole work could be carried out, if necessary, with military labour, only a certain number of officers and non-commissioned officers with railway training and knowledge being required. It also shows the various jobs that could be allotted to suit the varying degrees of skill. "Skilled labour" is intended to include works for which, perhaps, only sappers and miners would be fitted: by "Organized labour" is meant work that a pioneer regiment could do, or operations requiring only method and discipline such as any regiment could undertake, while "Untrained labour" includes only pick and shovel work which could be done by any troops, but for which cooly labour could be employed for choice, if there were no objections to its use. The strength of the first three parties will vary of course with the country to be traversed; in absolutely flat open country hardly any men might be wanted for these works.

No. 4 Party is calculated on the supposition that each relief will unload two trains, each carrying 1,600 yards (68 tons) of track, and link up the whole in six hours; that is to say, the strength is sufficient to link about  $3\frac{1}{2}$  miles a day for two reliefs. But it will not often be possible to construct the roadway at this rate, and working parties of this strength will therefore be seldom required.

No. 5 Party is calculated at a strength sufficient to keep with No. 4 and the same remarks apply to it.



Party.		STRENGTH REQUIRED FOR EACH DAY OF WORK IN EACH CASE.				
		Officers.	Non-commissioned soldiers.	Untrained labour.	Trained labour.	Untrained labour.
I	RECONNAISSANCE AND LOCATION. Survey ... ..	2	6	10	—	—
II	EARTH-WORK AND GRADING. Embankments and cuttings ... ..	1	6	—	—	—
III	BRIDGE-WORK. Erection of trestles and girders ... ..	—	—	15	—	—
IV	PLATE-LAYING (ONE RELIEF FOR SIX HOURS' WORK). (1) Unloading trains, assisted by (2) party ... .. (2) Working 12 trolleys between train and rail-head ... .. (3) Carrying rails and sleepers from train or trolley into position. ... .. (4) Marking centre line and sleeper spacing ... .. (5) Laying rails and spacing sleepers in position ... .. (6) Fitting rail joints ... .. (7) Keying sleepers ... .. (8) Repairs of tools ... .. Total of one relief ... .. Total of two reliefs with 10 per cent. extra men ... ..	1	1	6	—	—
V	ROCK PACKING (ONE RELIEF FOR SIX HOURS' WORK). (1) Shovel ing earth packing ... .. (2) Lifting, levelling, and straightening ... .. (3) Packing roughly ... .. (4) Finishing off joints ... .. Total of one relief ... .. Total of two reliefs with 10 per cent. extra men ... ..	1	1	6	—	—
VI	FINISHING OFF. (1) Repacking and finishing the line ... .. (2) Laying points and crossings ... .. Total ... ..	1	1	6	—	—
VII	AT RAIL DEPOT. (1) Sorting, loading, and despatching material ... .. Total for all works except earth-work ... ..	1	1	6	—	—

In the above table only officers and non-commissioned officers of railway experience are shown : it is assumed that all troops employed would have their own officers and non-commissioned officers under whose direct commands they would work.

That is to say, omitting the earth-work and grading, a force of some 1,600 men is required for plate-laying and bridging—works which are all within the capacity of sappers and miners and pioneers.

At first sight it may appear over-sanguine to expect these men to do railway work for which they have not been trained ; but, as a matter of fact, it is chiefly a question of good supervision and organization : in the plate-laying there is nothing that the men could not pick up in a few hours, while the greater part of it is mere manual labour : fishing is only the screwing up of a couple of bolts, and keying is easier than driving a common nail. The lifting and straightening is merely a matter of skill on the part of the supervising non-commissioned officers ; the bridging work is the same in principle as the bridging in which sappers and miners are specially skilled. To enable the latter to start with some knowledge of the erection of the trestle work, it might be a good thing to keep a few hundred feet of trestles at Roorkee, to enable them to practice erecting them quickly ; but even without such training their erection would present no difficulty to men trained in the lifting of spars and heavy weights and in the use of crowbar, tackle, and winch.

The officers would be Royal Engineer officers of railway experience, and the non-commissioned officers would be reservists from the State Railway Department of the Public Works—men who are usually employed in peace time on railways under construction by the State ; such works would generally be curtailed from financial exigencies during war, and the services of these men could therefore easily be spared.

Under the system at present in force a limited number of British non-commissioned officers of not less than three years' service are annually trained in engineering at Roorkee College, and after a three years' course a certain number are given appointments in the Military Works or the Public Works Department ; on getting these appointments they are promoted, if not already of that rank, to sergeant, and placed on the unattached list. At present only some seven appointments are given annually, of which only two go to railways : the men usually put in about ten years' service in the department before getting warrant rank, and thereafter serve on for pension in the successive grades of that rank. It being possible that some 40 non-commissioned officers may be needed for the simultaneous construction of two lines, some slight increase in the appointments to the Railway Branch might be necessary, since men who have only had experience in the military works, or on ordinary roads and buildings, will be of no use to supervise railway construction.

On the other hand, there is no reason why the service of civilian subordinates in the Railway Department should not be utilized

sleeper in general use on Indian railways seems most suitable; any unskilled labourer with half an hour's practice can drive the two keys which secure the rails true to gauge and by sending out the rails from the base with a pair of fish-plates loosely secured to one end of each, the linking of the joints, the only operation which must be consecutive and on which only a limited number of men can be employed, could be done at the rate of a pair of joints per half minute when the men have had a little practice, giving a speed of 1,040 yards an hour, or about  $3\frac{1}{4}$  miles in six hours' shift, that is, 7 miles a day if two reliefs are working.\*

(3) The packing and levelling is chiefly a question of having sufficient labour and that labour trained. At least 10 cubic feet of earth per yard will be required, possibly more if the road has been somewhat roughly formed, so that a man will probably not do more than two yards of filling and packing in an hour; that is, 150 men per mile, or 525 men per shift would be required to keep up the rate of  $3\frac{1}{4}$  miles of plate-laying.

That is to say, 7 miles a day might be laid if the material could be delivered at rail-head, which unfortunately is extremely improbable; for, as we have seen, a wagon will only carry a load of some  $11\frac{1}{2}$  tons equivalent to 265 yards of track; and if train loads are limited to 6 wagons, *i.e.*, 66 tons of material and 27 tons of dead weight which is the utmost that can be expected on a 1 in 50 gradient, each train will only carry 1,590 yards of track. On a line in working order and complete with terminal facilities it is improbable, as we have seen that more than 12 trains a day could be run, and it does not seem likely that more than 8 could be run in the initial stages when no terminal sidings exist and when working arrangements can hardly be expected to be complete. But even allowing these 8 trains, is it to be supposed that the General Officer Commanding seeing a growing line of railway in his rear will be content to make no use of it; there must be some give and take between the needs of the railway and those of the army in front, but even granted the greater urgency of pushing on the railway it seems only too probable that urgently required stores will be continually pushed up over it, so that it will only be possible to expect five trains a day for construction purposes. Of these probably one will have to be devoted to the supply of tools, stores, food, and water for the construction gangs, so that four trains a day of material, that is, 6,360 yards, about  $3\frac{1}{4}$  miles of track will be as much as can be expected, and this only on the assumption that sufficient rolling-stock is available.

\* NOTE.—As shewing that this much is certainly possible, the following extract from an account of the Ruk-Sibi plate-laying in 1879 is quoted (*vide* page 293 of Volume LXI of Pros. Inst. C. E.)—"Great care was taken in training the linking gangs, and in selecting the smartest men for this work. Eventually two pairs of rails could be linked per minute, whereas during the first week of plate-laying it took two minutes to link one pair." The material used was chiefly old, of 60 and 68 lbs. section; with new 25 lbs. rails even faster work might be expected.

† NOTE.—A case in point may be quoted, *vide* the account of the Ruk-Sibi plate-laying already alluded to (page 287, Volume LXI, Pros. Ins. C. E.)—"When to this is added first the vexatious delay to material trains caused by the sudden opening of the line for military traffic to Jacobabad.....It can easily be understood that progress for a considerable time was very slow."

It comes to this that, though a good type of material will facilitate the laying and reduce the labour required, the supply of material at rail-head will be the governing factor in the rate of progress, and under favourable circumstances 3 or  $3\frac{1}{2}$  miles a day is as much as we can expect. The truth of what was before stated, *vis.*, that within certain limits weight of material does not much affect the speed of plate-laying is now evident. For with a heavier rail more powerful engines and consequently proportionately greater train-loads are possible, and the same length of line can still be delivered by each train.

As the type of material known as the "Décauville" from the name of the French firm by whom it is chiefly manufactured has occasionally been advocated for field railways, it may be worth while, before passing on, to show why this type\* of material is to be avoided, though it no doubt has its advantages where only short light tramways are wanted, and where every labourer is a consideration. It has already been shewn that rails of 25 lbs. to the yard are the lightest advisable; a line of such rails with steel sleepers, weighing 35 lbs. each at 30" intervals, would weigh 92 lbs. per yard, so that bays 10' long, weighing about 300 lbs., would be the longest that could be loaded and unloaded and carried with any ease; 2' 6" sleepers would not be over 4' long, and the bays can therefore be packed in the trucks with the sleepers on end: the depth of rail and sleeper being about 6", 18 lengths of 10', weighing 2.5 tons, *i.e.*, 60 yards of track will go into a 25' bogie, making the weight of truck and load about 7 tons; if train loads are limited to 39 tons, as before, that is, 13 bogie loads, each train can only bring up 780 yards of track, and the day's work, if four trains a day at rail-head is the limit, will be limited to 3,120 yards, that is, about  $1\frac{1}{4}$  miles a day against  $3\frac{1}{2}$  which might be done with more suitable material. This material has several other drawbacks; owing to its non-flexibility, specially bent sections must be used on sharp curves and the bending would give endless labour at rail-head, since it would be impossible for the despatching officer at the base always to know what curvature was to be laid at any particular point. Besides this, owing to the necessity of having each length of a portable weight, the number of joints to be fished is more than double that of ordinary material, and extra labour with reduced progress would be the result.

The Décauville Company claim, among other advantages, that by rivetting the rails to the sleepers a safer and more cheaply maintained road is obtained, and that with given axle-loads a line can be safely used 25 per cent. lighter than would be possible, were the rails only keyed or spiked to the sleepers. These advantages are open to doubt, but be they what they may, they are outweighed in the present case by the disadvantages already alluded to.

So much for the theory. But before the rails can be laid the road must be constructed; a road, it is true, only some 8' wide, but with limited grades and limited curves. Nine-tenths of Indian warfare is in

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uncivilised country, where the only roads are mere mule-tracks, where nullahs will have to be bridged, cuttings made here, and banks there, and where time may be required to find even a possible alignment. The speed in such cases will be mainly a question of labour available. A certain amount of work can be saved by having plenty of bridging material and trestles in stock; cuttings must occasionally be faced; but the difficulties of embankments and bridging can be largely reduced by having a liberal supply of light steel trestle work and girders of different spans. A small ravine to be crossed might necessitate a 15' bank which would take perhaps four or five days to complete, while light trestles of simple construction could be put up in five or six hours with a tenth of the labour; this should be a most essential item of any field railway plant, far more important in fact than the details of a rail joint or a sleeper attachment. Time can also be saved at commencement by having some knowledge of the obstacles ahead and the route to be followed. With the best materials and organization time will be lost if ten or fifteen days are wasted in preliminary reconnaissances of the first 20 or 30 miles in order to discover a practicable route before anything beyond the base sidings can be laid.

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The conclusion so far arrived at as regards economy, capacity, and time may be briefly recapitulated as follows:—

- (1) in open country and under favourable conditions light railways will be useful and economical even in small campaigns, when three or even two brigades are in the field;
- (2) but their capacity in hilly country is so reduced that it will not be wise to rely on them to supply a large force, two divisions and their line of communications being probably as much as they can safely be expected to serve;
- (3) in any but open country the time available may render their construction in war out of the question.

And under the most favourable circumstances they cannot be expected to keep up with an army's advance, and the carriage of troops must be considered no part of their normal duty. The fact is that Indian warfare is usually conducted in countries as unsuited for the rapid construction of light railways as they can possibly be. Admitting that it will seldom be possible to construct them with

advantage during active operations, it seems wisest to adopt the policy of constructing them whenever possible in time of peace, when their rôle will be to serve our advanced posts on the frontier, bringing places at present isolated within easy supporting distance of the larger cantonments.

The construction of the line from Nowshera to Dargai is one instance, and several other favourable places doubtless exist where similar lines could be built with advantage; and if this policy is followed up, the necessity for constructing light railways during Indian campaigns will gradually grow smaller and smaller. Still, unforeseen contingencies will arise and must be guarded against, extend our systems in peace how we will, while at present, at any rate, we have also to provide for the too well foreseen contingency when British troops may again have to advance from Chaman and Landi Kotal, but for whose future support we are debarred by political reasons from providing railway communication beforehand.

And even were it impossible that light railways would ever be needed in any other instance, the interests at stake in that one case may be so great that for it alone the provision of a certain amount of railway plant seems more than justified. On what will be our southern line of communication some provision already exists, and from what is known of the difficulties to be met, it seems reasonable to expect that a broad gauge line, such as is proposed, could be built at reasonable speed, though here also the advantages of a light line that could be laid on ahead of the more slowly advancing broad gauge are obvious.

But further north we may be called on to put a force into the field of such size that, without railway communications, it will be impossible to maintain it there; and for this at present we have no provision whatever. After what has been said, it is certainly doubtful whether a narrow gauge line will altogether suffice. But in face of difficulties to be met in this locality, it is out of the question to expect to build a broad or even a metre gauge line except after considerable time, and it seems folly to renounce the aid of a light line that could carry some 400 tons daily, simply because by itself it may not prove sufficient. It would at all events afford immense relief to the animal transport, and would render possible what might otherwise be impossible.

A change in the present policy of the ruler of Afghanistan may result one day in the construction during peace time of those extensions of our Indian strategic lines without which we cannot be in an assured position to give the Amir speedy and substantial assistance against dissension from within, or aggression from without, his dominions—extensions which have been advocated before now by writers on the Afghan question as being both a safeguard in war and a civilizing influence in peace.\*

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\* "Russia in Central Asia." By the Honourable G. Curzon, page 273: also "Imperial Defence." By Sir C. Dilke and Spenser Wilkinson, pages 162 and 168. The former author is referring mainly to the northern line; the latter to both the northern and southern lines.

But for the present the most we can do is to have the materials ready for a temporary line to be laid on emergency and to be followed up by the broad gauge as quickly as possible.

If it is admitted that this is the foremost contingency to be kept in view, India's primary requirements of stock and material seem very clearly indicated. It has been shewn that even with fairly substantial material, weighing about 35 lbs. per yard, a 2' 6" line may not be equal to all requirements; that a lighter rail has little, if any, advantage in speed of construction in the localities where it will have to be laid, and that the increased supply of rolling-stock necessary, and other considerations may render even its economy doubtful.

The necessary amount of material of a substantial type and rails of not less than 35 lbs. per yard should therefore be ranked as first among India's needs in the way of plant. If this is not sufficient for all probable requirements, a certain amount of lighter material of about 25 lbs. per yard or 12½ lbs. tramway plant will no doubt be useful in cases such as those described in the earlier pages of this paper when discussing the economy of light lines; but such material should be recognised as second only in order of importance.

## PART II.

### THE CONSTRUCTION AND WORKING OF LIGHT RAILWAYS.

The following pages deal only with the organization required for constructing and working new railways in time of war, and not with larger schemes such as have been advocated for working our frontier and strategic lines by a military corps; nor is it proposed to deal with the equally pressing necessity for reinforcing in war time the organization of the principal lines on which the stress of mobilisation will fall, nor with the still greater need for safeguarding the railways of India in times of internal disaffection.

The last two questions concern only broad gauge lines and are not within the scope of this paper.

The first is, to a certain extent, connected with the extension of lines in war. A scheme of this sort was sketched out by Lieutenant Yate in the United Service Institution of India Journal (Volume XV) in the year 1887; but, though it is believed to have been the outcome of several years' discussion, yet, after the lapse of several years, we are now no nearer its attainment; and, even admitting the need of some such scheme, in the form then proposed, it undoubtedly had many drawbacks. It had in view not only the obvious necessity of safeguarding our frontier lines during disturbances both within and beyond the border, but also the provision of an organization for extending these lines in time of war. What strikes one as a disadvantage in the latter part of the scheme, is that those frontier lines, which it was proposed to work by a military corps, are the very lines on which the greatest stress of traffic will fall on mobilisation; and if they are to be worked at all economically in time of peace, they will



require reinforcing rather than depleting in time of war; the men who have had experience of their working in peace will be the very men that will be wanted at such times, and to draft these men away for new extensions and fill their places with men without experience of the locality seems to be a dangerous policy. Such frontier corps might, of course, be made large enough to meet both requirements were expense no object, but such is unfortunately not the case, and we must look to other sources to supply most economically our needs, leaving the defence of our main frontier lines to be dealt with independently. Lest the following pages should appear to contradict the above lines it is emphasized that only the main lines, the main channels of mobilisation are referred to above. Between these and the light frontier railways, from which it is proposed to form the nucleus of the railway corps, there is a considerable difference—a difference of kind, not merely of degree.

But before going further into these sources of supply, it is necessary to know exactly what is wanted. It has already been pointed out that the working of the lines of an invaded country at present form no part of an Indian railway corps; and it may be premised that a hundred or perhaps 200 miles of railway is the very most that is likely under present circumstances to be built during war time, while the requirements of an average campaign will be considerably less; it is proposed therefore to sketch out the construction and working of a 50-mile 2' 6" line, and such an organization as could be expanded in case of need, to work about 100 miles of railway.

#### THE CONSTRUCTION OF THE LINE.

Though it will generally be best that the officers and supervising staff should be military men, under the orders of the General Officer Commanding, it will usually be possible and often advisable to get the bulk of the work done by civil labour. With good pay and proper protection, the Indian cooly of the right stamp will go almost anywhere and under fair treatment is capable of much. Where he can be employed without danger, it will generally be best to do so, and so set free the troops for their proper duties; in fact, it will seldom be possible to spare enough troops to execute works of any size, nor advisable to attempt such works unless cooly labour is forthcoming; such labour has been largely employed on road-making in almost every Indian frontier campaign and can similarly be counted on in nine cases out of ten for the bulk of the labour required for making railways. Could the new road from Dargai over the Malakand to Chakdarra, for instance, have been executed in the time it was, during the campaign of 1895, or any of the heavier works that have been carried out during frontier campaigns, without the plentiful supply of cooly labour that has always been available?

Still, at times, the state of the country may render it impossible or inadvisable to use civil labour; in cases of urgency time may be wasted at the start in collecting such labour, and there ought to be some organization to fall back on. Omitting the numbers required

for the earth-work, grading, and bridging, which are of course entirely problematical, we require a force of about seven officers and 1,000 non-commissioned officers and men as a minimum, while including the men required for these works some thousands may be required, and on grounds of economy alone, the maintenance of so large a force or even of the minimum required, solely as a railway corps, seems to be out of the question, if existing resources can possibly be made to suffice.

If it is considered worth while paying for a railway battalion after the continental pattern, the thing is simple enough; otherwise India's wants must be met in the cheapest manner possible, and existing organizations must be made the fullest use of.

Nor, so far as construction is concerned, does any new organization appear necessary, when we already have officers and non-commissioned officers always employed in peace time on state railways to supply the supervision, and the large resources of railway labour continually employed on the construction of new railways at the services of the State Railway Department; while, if for any reason these resources fail us, we can fall back on sappers and miners, pioneers, and infantry regiments whose training already gives them the various degrees of skill required in railway construction.

The following estimate, practically a table of working parties, shews in detail each operation in construction, as far as it can be foreseen, and how the whole work could be carried out, if necessary, with military labour, only a certain number of officers and non-commissioned officers with railway training and knowledge being required. It also shows the various jobs that could be allotted to suit the varying degrees of skill. "Skilled labour" is intended to include works for which, perhaps, only sappers and miners would be fitted: by "Organized labour" is meant work that a pioneer regiment could do, or operations requiring only method and discipline such as any regiment could undertake, while "Untrained labour" includes only pick and shovel work which could be done by any troops, but for which cooly labour could be employed for choice, if there were no objections to its use. The strength of the first three parties will vary of course with the country to be traversed; in absolutely flat open country hardly any men might be wanted for these works.

No. 4 Party is calculated on the supposition that each relief will unload two trains, each carrying 1,600 yards (68 tons) of track, and link up the whole in six hours; that is to say, the strength is sufficient to link about  $3\frac{1}{2}$  miles a day for two reliefs. But it will not often be possible to construct the roadway at this rate, and working parties of this strength will therefore be seldom required.

No. 5 Party is calculated at a strength sufficient to keep with No. 4 and the same remarks apply to it.

Party.		SUPERVISION REQUIRING RAIL- WAY EXPERIENCE.		Skilled labour.	Organized labour.	Untrained labour.
		Officers.	Non-commissioned officers.			
I	RECONNAISSANCE AND LOCATION.					
	Survey ... ..	2	4	10	...	...
II	EARTH-WORK AND GRADING.					
	Embankments and cuttings ... ..	1	4	...	...	500 to 5,000
III	BRIDGE-WORK.					
	Erection of trestles and girders ... ..	...	...	150	...	...
IV	PLATE-LAYING (ONE RELIEF FOR SIX HOURS' WORK).					
	(1) Unloading trains, assisted by (2) party ... ..	I	I	...	30	...
	(2) Working 12 trollies between train and rail-head ... ..			...	48	...
	(3) Carrying rails and sleepers from train or trolley into position. ... ..			...	120	...
	(4) Marking centre line and sleeper spacing ... ..			4	...	...
	(5) Laying rails and spacing sleepers in position ... ..			...	30	...
	(6) Fishing rail joints ... ..			12	...	...
	(7) Keying sleepers ... ..			24	...	...
	(8) Repairs of tools ... ..			6	...	...
	Total of one relief ... ..	1	2	46	208	...
	Total of two reliefs with 10 per cent. extra men ... ..	2	4	101	457	...
V	ROUGH PACKING (ONE RELIEF FOR SIX HOURS' WORK).					
	(1) Shovelling earth packing ... ..	Superintended by officer in charge of plate-laying.	I	...	150	...
	(2) Lifting, levelling, and straightening ... ..			...	30	...
	(3) Packing roughly ... ..			...	40	...
	(4) Finishing off joints ... ..			8	...	...
	Total of one relief ... ..	...	2	8	210	...
	Total of two reliefs with 10 per cent. extra men ... ..	...	4	18	462	...
VI	FINISHING OFF.					
	(1) Repacking and finishing the line ... ..	I	2	...	360	...
	(2) Laying points and crossings ... ..			40	...	...
	Total ... ..	1	4	40	260	...
VII	AT BASE DEPÔT.					
	(1) Sorting, loading, and despatching material ... ..	1	2	...	100	...
	Total for all works except earth-work ... ..	7	22	319	1,279	...

In the above table only officers and non-commissioned officers of railway experience are shown : it is assumed that all troops employed would have their own officers and non-commissioned officers under whose direct commands they would work.

That is to say, omitting the earth-work and grading, a force of some 1,600 men is required for plate-laying and bridging—works which are all within the capacity of sappers and miners and pioneers.

At first sight it may appear over-sanguine to expect these men to do railway work for which they have not been trained ; but, as a matter of fact, it is chiefly a question of good supervision and organization : in the plate-laying there is nothing that the men could not pick up in a few hours, while the greater part of it is mere manual labour : fishing is only the screwing up of a couple of bolts, and keying is easier than driving a common nail. The lifting and straightening is merely a matter of skill on the part of the supervising non-commissioned officers ; the bridging work is the same in principle as the bridging in which sappers and miners are specially skilled. To enable the latter to start with some knowledge of the erection of the trestle work, it might be a good thing to keep a few hundred feet of trestles at Roorkee, to enable them to practice erecting them quickly ; but even without such training their erection would present no difficulty to men trained in the lifting of spars and heavy weights and in the use of crowbar, tackle, and winch.

The officers would be Royal Engineer officers of railway experience, and the non-commissioned officers would be reservists from the State Railway Department of the Public Works—men who are usually employed in peace time on railways under construction by the State ; such works would generally be curtailed from financial exigencies during war, and the services of these men could therefore easily be spared.

Under the system at present in force a limited number of British non-commissioned officers of not less than three years' service are annually trained in engineering at Roorkee College, and after a three years' course a certain number are given appointments in the Military Works or the Public Works Department ; on getting these appointments they are promoted, if not already of that rank, to sergeant, and placed on the unattached list. At present only some seven appointments are given annually, of which only two go to railways : the men usually put in about ten years' service in the department before getting warrant rank, and thereafter serve on for pension in the successive grades of that rank. It being possible that some 40 non-commissioned officers may be needed for the simultaneous construction of two lines, some slight increase in the appointments to the Railway Branch might be necessary, since men who have only had experience in the military works, or on ordinary roads and buildings, will be of no use to supervise railway construction.

On the other hand, there is no reason why the service of civilian subordinates in the Railway Department should not be utilized

except for the fact that they could not be ordered on active service where they would be subject to military discipline except with their own consent.

At the above estimate two, or possibly three, companies of sappers and miners and about two battalions of pioneers, working of course directly under their own officers and non-commissioned officers, would supply the whole of the labour required for all except the earth-work and grading; for the latter, military or cooly labour would be employed according to circumstances; the amount is too problematical to enable any reliable estimate to be made.

Such would appear to be a perfectly adequate organization for the construction of the line when civil labour is not to be employed more than possible. It is not to be expected that for the first day or two things would progress at the maximum speed, but after the first day or two there is no reason why the line should not progress with as great speed as could be hoped for with a trained railway corps.

#### WORKING THE LINE.

For maintaining the line and working six trains daily in each direction through ten stations on a 50-mile length, approximately the following staff would be required:—

		TRAFFIC.							LOCOMOTIVE.					ENGINEERING.						
		Manager.	Assistant Traffic Manager.	Station Masters.	Assistant Station Master Signallers.	Pointsmen.	Shunters.	Guards.	Locomotive Superintendent.	Locomotive Foreman.	Drivers.	Firemen.	Cleaners.	Mechanics.	Engineer.	Permanent-way Inspectors.	Gangmen.	Carpenters.	Blacksmiths.	Total.
Officers	...	2	...	...	...	...	...	...	1	...	...	...	...	...	1	...	...	...	...	3
Non-commissioned officers (British).	...	1	2	20	...	...	14	...	1	14	14	...	...	...	...	3	...	...	...	69
Men (Natives)	...	...	...	...	30	20	...	...	...	...	...	10	20	...	...	150	4	6	...	240

In the above list all men, who must necessarily be Europeans, are classed as non-commissioned officers; the locomotive workshop staff given is sufficient only for light repairs; heavy repairs, if necessary, would have to be undertaken by the nearest existing railway. No booking or accounting staff is included; the booking would be done by the Commissariat Department, but a small clerical staff would probably be necessary for the Manager and Assistant Traffic Manager, besides pay clerks for the three departments.

Except in cases where the line is in Indian territory and the country is undisturbed, when the whole thing could be built and worked by the Civil Department of State Railways, it is essential that the whole working staff, whether soldiers or not, should be under the General Officer Commanding, and subject to military law as officers, soldiers, and followers. The engineering staff for maintenance will at first be drawn, as the line gradually extends, from the men in Nos. 5 and 6 Parties of the construction staff who will have learnt by then the work required of them; afterwards, if the state of the country permits it, it would probably be preferable to enrol native plate-layers and gangmen from India, who would serve under a definite agreement and be subject to military law as followers, and so set free the more valuable fighting material for service at the front. There remain to be provided the locomotive and traffic staffs, consisting of 66 European non-commissioned officers and 80 natives, who may be designated as one railway corps unit.

With many thousands of railway servants of all classes employed by the Government on some 4,500 miles of State Railways in Northern India, it would appear, at first sight, an easy thing to provide sufficient staff for working some 100 miles, of narrow gauge extensions, by simply engaging sufficient men on State lines under suitable agreements, to serve for a definite period, and, when necessary, beyond the frontier, to be called up on mobilization at a moment's notice. But their case differs from that of the construction staff. Railways in India, and equally State Railways, must be worked economically, and unfortunately the normal staff employed in peace time does not allow even this much margin to provide staff for new military lines, while, at the outset of a mobilization on any considerable scale on the North-West Frontier, not only would the combined staffs of the State Railways be unable to spare a single man, but the North-Western Railway alone would require to be reinforced by extra staff which, in some cases, would far exceed the total staff required for two "railway corps."

Any scheme to provide the corps entirely from State Railways or from Railway Volunteer Corps would therefore unavoidably be but a corollary of the larger scheme for manning these lines to meet the pressure of a large mobilization. For it seems manifestly illogical to provide for railways beyond the base of operations by reducing the efficiency of the more important lines in rear, to solve, in fact, one difficulty only by increasing another.

It would be easy enough to keep the State Railway staff up to a strength equal to meeting the maximum demands of a large mobilization simultaneous with military extensions were it not that the cost which, at a guess, could not be less than 10 lakhs a year would not be justified by the necessity. Though not a railway corps in name, and though its cost would be thinly disguised as railway expenditure, it would, in fact, be a large and expensive railway corps. Nor is the necessity altogether proven. The cases in which State Railways will require to be reinforced to the extent above alluded to will be extremely rare, and will amount to emergencies of national importance when

the whole of the railways throughout India may be relied on to give, without the slightest coercion, every aid, in the way of staff, that is, in their power. Such an emergency could hardly arise without warning, and there seems little doubt that the combined resources of all the railways, if called into play, would be ample to meet it. But this is a question on which it is impossible to dogmatize without a full knowledge of facts and figures. A combination of war, famine, and plague, or other causes producing a dearth of labour might render even those large resources inadequate. The question requires consideration : to suggest a remedy is outside the scope of this paper.

But granted, it is impossible to draw on State lines in great emergencies, equally it seems inadvisable to do so in minor ones ; cases when the powers of the State lines will be taxed to the utmost, but when the emergency will not be sufficient to induce the various companies to put themselves to inconvenience and possible loss in supplying staff to make up for men drawn off for new military lines. In such cases every effort should be made to avoid interference with the internal trade and organization of Indian railways. State lines must therefore make as few calls as possible on the companies' railways, and new military lines must further this object by obtaining their staff as far as possible from sources independent of either.

But at the same time it must be remembered that after all the troops and the first rush of supplies and material have been despatched to the front, the pressure on the broad gauge lines will very materially subside, and they will be left working with not very much more than their normal traffic. That is to say, in the larger operations when military railways of some length may be required, some six or eight weeks after the first mobilization, by which time one or perhaps two light military extensions of 50 miles each is the utmost that will have been constructed, the broad gauge State Railways will no longer require the extra staff that was necessary at first and will be in a position, if necessary, to supply the military lines. It will therefore probably suffice to have two railway corps, each strong enough to work about 50 miles of line, afterwards relying on State Railways for additional staff, if the military lines have to be further extended.

If then our present requirements can be met by two such railway corps as have been described, the difficulty should not be great. Assuming that to keep two such corps unemployed, or unprofitably employed (in a financial sense) in peace time is out of the question, there remain but two alternatives. Either to keep a complete corps and find them profitable employment in peace, or to maintain some nucleus of staff and merely train sufficient men from British and Native regiments, to form a sort of railway reserve force and mobilize them into a railway corps only in cases of necessity.

The former alternative is doubtless the best, but it is the one which presents most difficulties—railways under construction by the State, work on which would either cease or be considerably curtailed owing to financial exigencies in war, offer just the sort of opportunity that is wanted ; but such lines could only find employment for the

construction staff who, as we have seen, only number some 20 non-commissioned officers for each corps: the working staff such lines could hardly employ at all. It would be possible, perhaps, to employ this staff on small branch lines of the State Railways, which could be temporarily closed when the services of railway corps were required elsewhere: but, from an economical point of view, the plan does not seem sound. It is difficult to point to any such lines in existence, nor does it seem likely that any will be found which it will be worth while building on these conditions, and it seems best, on the whole, to adhere to the policy of keeping the railway corps organization, as far as possible, aloof from commercial railways. Nor is it possible, for the present at any rate, to rely on a similar plan with regard to permanent military 2' 6" lines. In time to come we may have such an extended system of these lines that it may be possible to rely on closing one or other of them to supply the staff for temporary lines, but, under present circumstances, it is out of the question. The latter alternative seems therefore to be the most feasible, and, though there are doubtless many objections, it seems, under present circumstances, to be sufficient; that is, to maintain in peace only the nucleus of the railway corps, and train the men in peace, to be formed into the necessary organization in war. For such a purpose the permanent light frontier lines already advocated seem eminently suited, and afford means of carrying out the objects in view which would not be obtainable equally well elsewhere, though, for the present of course, they are wholly inadequate to the purpose, and broad gauge lines must be utilized. For it could probably be arranged that these light lines should be worked by soldiers or reservists—a plan in many ways desirable if soldiers with the colours are to be trained for the railway corps, and which would not be equally feasible on the ordinary broad gauge railway. Such an arrangement is not incompatible with their economic working on commercial principles as adjuncts of and under the control of the State lines of which they are branches, and does not necessarily involve making them an independent military system.

In the second place, the training of the men on these lines will give them an acquaintance with stock and materials practically the same as those of the light field lines, and practice in its working which could not be got equally well on broad gauge railways.

In the third place, drawing on the staff of these lines, for the first men wanted for the railway corps, need cause but small inconvenience. After what was said in connection with Major Yate's scheme, this may at first appear contradictory; but when, as it is to be hoped there soon will be, there are several separate 2' 6" lines at different points on the frontiers, so far apart that simultaneous disturbances and equal pressure of traffic over all of them is extremely improbable, it will be easy to draw the first men wanted for the railway corps from the least disturbed localities. For it must be remembered that the whole corps will not be wanted at the start, but will only be mobilized gradually as the line advances. Moreover, these permanent 2' 6" lines, besides serving our advanced garrisons on the frontier, will chiefly be of use in minor operations



in their neighbourhood when temporary light lines will not be constructed. The latter will mainly be needed in larger campaigns when the stress of mobilization will fall almost entirely on the broad gauge strategic lines, while the permanent narrow gauge lines will remain at normal pressure.

Briefly then the scheme is this—to work the permanent 2' 6" railways just as if they were commercial lines under the management of the State Railways of which they are branches; but to form the European working staff of soldiers who have completed their colour service; and to train annually a certain number of men in the second or third year of their colour service as drivers, firemen, signallers, and guards, from whom, after they have finished their colour service, the permanent staff of these light lines will be recruited, the trained men still with the colours and the reservists serving in the permanent light lines, thus forming two sources of supply for the European working staff of the new military lines. It means practically only slightly modifying and systematising the plan which has already been inaugurated, by which it is intended to train soldiers in various railway duties on the railways adjoining the localities where they may happen to be stationed; but for the railway corps it must be seen that a definite number of men of each class, drivers, guards, etc., are trained annually, and the organization must exist complete on paper at what would become the mobilization station of each corps, where the name and regiment of every man required on mobilization would be kept. Until there is a more extended system of 2' 6" lines than can be hoped for the next few years, there will be no alternative but to train the majority of the men required on broad gauge railways as at present; preferably those under State management. Whether their training on these lines will be as feasible as it would be on frontier 2' 6" lines under a semi-military organization is open to some doubt.

The scheme that has already been started is still in the experimental stage: it remains to be seen whether soldiers will take readily to service among civilian employés of a class to whom they are mostly strangers and under civilian officers who can hardly be expected to take a very large interest in their training and welfare. Those who know drivers and their ways will probably have some misgivings as to the cordiality with which they will receive Thomas Atkins come for a 12-month training, and, on the treatment he receives from both officers and employés, will depend the success of the scheme. For from the soldier's point of view the inducements are not great and the ultimate advantages that the men will gain by the training must not be over-estimated: a few men will go through it, perhaps with a view to obtaining employment on Indian railways after discharge from the colours, but the employment of reservists in India, to any great extent, can hardly be encouraged by the Military Authorities at home; the majority of men who go home will be disappointed if they think that their training will get them immediate employment as guards or drivers on English railways, where men have to work their way up from the very bottom.

The railway corps, however, involves the training of so few men annually that such general objections are not likely to affect it much: and whatever difficulties may arise on account of the unpopularity of the training, as it is done at present, will be considerably lessened, and the scheme will have a better chance of success if that training can be given among men who are themselves soldiers, and under officers who have a definite interest in seeing it properly carried out, that is, on the military 2' 6" frontier lines, or on certain selected sections of State Railways, where it can be worked with some method and continuity.

The above remarks apply only to the Europeans; for the native staff required the plan is not, perhaps, equally feasible.

Before, however, discussing other difficulties which suggest themselves, it will be well to see exactly what men must be trained annually, and how each class of men, both British and Native, can most easily be obtained.

Of the non-commissioned officers the drivers and firemen hold the most responsible posts and are in a way the most important men on the line; the men who must be most carefully selected and whose training will take longest; to teach men without previous knowledge, a year, at least, will be required; and afterwards a short annual training to keep them in practice will be equally essential; assuming that they put in two years' colour service after completing their training, it will be necessary to train 28 drivers and firemen annually for the two corps; firemen might require less, but it will probably be best to give both a similar training at the start, promoting the most promising men to drivers after a certain time, and giving each a certificate, at the end of the course, according to the skill they have acquired.

The training of the guards will take far less time; given men of a certain amount of education, one or two months would suffice, and, on the same supposition as before, 14 men must be trained annually.

For the assistant station masters, who must be also signallers—men who have done a course of signalling under the system already in practice, must be selected; for these also a very short course will suffice. The military signallers, who rendered such good service in the Great Indian Peninsula strike in 1898, from all accounts learnt their duties in a very few days, although they had presumably never done any railway work before.

Traffic inspectors and head station masters will best be drawn from the existing staff of the permanent 2' 6" lines; vacancies being temporarily filled (where necessary) by men previously trained.

So far only the British staff have been considered, all of whom are to be soldiers; granted even that it were feasible, is it necessary to adopt a similar plan with regard to the native staff, in order that every man of the corps may be a soldier? The advantage seems doubtful. Passive disaffection may certainly have to be faced in the country through which the railway passes, but if anything like active opposition is to be met, it seems improbable that it will be possible to work the railway at all. Even were all the men trained to arms, an

organization such as has been described cannot be considered an efficient fighting unit. If it is essential that it should be, then the only thing is to have a separate corps on the lines of a sapper and miner, or an English railway sapper company. But it is by no means easy in India to get natives who combine good fighting qualities with the qualifications necessary to make them useful railway men. By attempting to combine a railway corps and a fighting unit, we run the risk of getting something that is really not of much use for either : the primary, in fact the sole duty of the corps is to work the railway, and though it is, no doubt, desirable that the British staff, the men, with greater responsibilities, should be soldiers, it does not seem really essential that every man of the corps, more especially the native staff in less responsible and less exposed positions, should be trained to arms.

The fewer unarmed defenceless men we have the better no doubt : but some 50 or 60 unarmed but disciplined men seems a small thing to object to when, but for the railway, there would probably have been some thousands of unarmed and undisciplined transport followers.

If then it is granted that there is no absolute necessity that the native staff should be soldiers, it will probably be possible and easiest in their case to make an exception to the general rule and draw them from the staff of State Railways ; for there are not the same objections in their case that there are in the case of drivers, guards, etc. The 50 odd workshop men and cleaners could always be spared, if necessary ; for, on a large railway, all, except urgent repairs, can always be deferred for a short time, and the workshop staff temporarily reduced in spite of an increase in the traffic. Moreover, they would mostly be employed at the base, practically on their own railway, but under the orders of the officers of the railway corps.

In fact, it is difficult to see from what other source these men are to come ; for, outside railway workshops, India scarcely produces anywhere the sort of man wanted.

Pointsmen and shunters could certainly be ill-spared from State Railways during a heavy traffic. The North-Western Railway would certainly want to largely increase its staff of men of these classes during mobilization, but to what extent it is difficult to say. Still the only alternative to getting them from State Railways seems to be to adopt the same plan as for the British non-commissioned officers and train sepoys, though it is a little doubtful whether sepoys would take readily to the scheme. The plan was once tried of giving sepoys of pioneer regiments some instruction in railway work, but does not appear to have been carried on. If it is given a really fair trial, the difficulties may not turn out to be really very great ; experiment only can decide.

There is not space here, nor would there be any use, in discussing the minor details of a scheme that criticism from other points of view will probably show to require many modifications.

Of the objections, which suggest themselves, the principal one seems to be that the scheme involves reducing the strength of our

present forces by possibly 250 men for every 50 miles of line ; in fact, that one might as well take the men straight away from their regiments and form them into an organized corps at once. And this might certainly be the best plan were it likely that the corps will be wanted in every campaign, which, under present circumstances, is not the case. In answer to the objection, it can only be said that if the men cannot be spared from our present forces, the only alternative is to have a separate corps, and it becomes merely a question of whether the expense is justifiable. In favour of the scheme, it may be argued that the railway corps are just as much a part of the fighting force as troops on other parts of the line of communication, and that, but for the railway, a considerably larger number of troops would be needed to guard the road transport over the same distance, so that the railway in one sense gives an increase to the fighting force in the field.

Again, it may be objected that, where speed in commencing and carrying on the work is of such vital importance, an organization which has to be collected from so many sources is bound to fail. As far as the staff and labour for construction are concerned, the objection may certainly have some weight, but whatever the means adopted for constructing the line, it is bound to hold in a greater or lesser degree.

Against the working staff the latter objection has far less weight ; for it must be remembered that this staff will only be required gradually as the line advances and traffic increases, and only by the time there are some 50 miles in working order, that is, probably six or eight weeks after commencement will the corps have to be brought up to its full strength ; and, during this period, there should be no difficulty in gradually getting together and organizing the men. That is always provided we have the requisite men and know where to find them ; how this can be done, it has been attempted to shew in the previous pages.

Here in India we cannot afford to provide for more than present needs. The future may see Kabul and Kandahar in direct railway communication with India, and the Trans-Caspian system extended beyond its present southern terminus, until in time to come the railways of India and Turkistan shall be joined together, while the latter shall be linked by direct railway communication with those of Russia. Were such a consummation already within the sphere of practical politics, it might behove us to plan accordingly and organize that "system of military service now generally adopted by the four great military powers of Europe"\* which has already been advocated in the pages of this Journal.

But if ever it comes, it can only be by long and gradual stages ; and as railways and frontiers advance, and political conditions change, there will be ample time to reconsider India's military railways and their organization. Rather than provide for an uncertain future, we should be prepared for the first move in the game, which can be foreseen with comparative accuracy ; and for this the scheme now advocated, insignificant though it be, should prove sufficient.

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\* Volume XV, page 120.

## APPENDIX I.

## Estimate of

## THE DAILY REQUIREMENTS OF AN INFANTRY BRIGADE.

VIDE APPENDIX B, FIELD SERVICE MANUAL.

1,720	British fighting men	at 3 lbs. each	= 5,160 lbs.
1,508	Native	" at 2½ " "	= 3,770 "
1,265	Followers	" at 2 " "	= 2,530 "
1,148	Animals	" at 22 " "	= 25,256 "
			459 maunds = 36,716 "
	Ordnance and engineering stores	approximately	4½ maunds.
	Total	500 maunds,	or about 18 tons.

## Estimate II.

## DAILY REQUIREMENTS OF A DIVISION OF ALL ARMS AND A CAVALRY BRIGADE.

VIDE APPENDIX I, COMMISSARIAT AND TRANSPORT FIELD SERVICE CODE.

6,965	British fighting men	at 3 lbs. each	= 20,895 lbs.
9,149	Native	" at 2½ " "	= 22,872 "
8,188	Followers	" at 2 " "	= 16,376 "
			60,143
			= 751 maunds.
Grain for animals, vide Appendix 22 ... }			
Table F, Commissariat—Transport Field Service Code. }			
			= 1,233 "
	Fodder for animals, vide "Supplies," paragraph 260		= 3,700 "
	Fuel for troops, vide "Supplies," paragraph 249 ...		= 807 "
	Ordnance, engineering, and medical stores about		500 "
	Total	...	= 6,991 "
	or approximately Total	...	= 250 tons.

Estimate of the average space required for 1 ton of the stores of a division of all arms in the proportion given above—

Grain	$\frac{1984}{28}$	tons at 70	c. ft. per ton	= 4,960 c. ft.
Fodder	$\frac{3700}{28}$	" 170	" "	= 22,500 "
Fuel	$\frac{307}{28}$	" 100	" "	= 2,882 "
Ordnance stores	$\frac{200}{28}$	" 60	" "	= 428 "
Medical	$\frac{300}{28}$	" 80	" "	= 857 "

Total 250 tons at average 126 c. ft. ... = 31,627 "

The bulk in each case is approximately the actual space occupied by grain in bags, compressed fodder, fuel cut up for burning, etc. As the actual proportion of ordnance stores would probably be greater, the average bulk might generally be less; 120 cubic feet per ton might be taken as a fair average bulk.

## APPENDIX II.

*Estimate of the cost of plant required for a 50-mile 2' 6" line with 25-lb. rails, each 26 feet long on steel sleepers and rolling-stock sufficient to carry 110 tons per day.*

	Rate.	Unit.	Total.
50 miles permanent-way, complete ... ..	10,000	Mile	5,00,000
2½ „ extra for sidings ... ..	10,000	„	25,000
5 engines, complete ... ..	25,000	Each	1,25,000
40 bogie trucks or 80 four-wheelers ... ..	2,500	Each bogie	1,00,000
Pumps and piping for watering engines at two terminal and one intermediate station ... ..	10,000	Station	30,000
30 sets of points and crossings ... ..	200	Set	6,000
Tools and plant for plate-laying and construction... ..	Lump sum	...	10,000
Workshop tools for repairs ... ..	„	...	15,000
200 tons trestle work of average height, 10 feet ... ..	200	Ton	40,000
20 spans light girders of 20 feet span ... ..	450	Span	9,000
Total ... ..	...	...	8,60,000

The cost of permanent-way materials is based on prices reported current in the English market for 1899; the cost of rolling-stock is based on the actual cost of certain engines and wagons now in India. A detailed estimate of the cost of 1 mile of permanent-way is as follows :—

Weight, tons.	Item.	Rate per ton in England.	Cost f.o.b. in England.	Sea freight at £ 1 per ton.	Cost landed in India.
		£	£	£	£
40	Rails at 25 lbs. per yard ... ..	6-10	260'00	40	300
1'66	Fish-plates at 9½ lbs. per pair ... ..	8-10	14'11	1'66	15'77
'65	Fish bolts at 14 oz. each ... ..	16-0	10'40	'65	11'05
31'50	2,000 sleepers weighing 35 lbs. each ... ..	7-10	236'25	31'50	267'75
1'12	Keys at 10 oz. each, two per sleeper ... ..	7-10	8'40	1'12	9'52
74'93				Total ...	604'09
					Rs.
Tons	£265 at Rs. 15 = £1 ... ..	...	...	...	9,075
75	Carriage of the material, 800 miles inland from the seaport at Rs. 14 per ton ... ..	...	...	...	1,050
	Total cost in India, 800 miles inland ... ..	...	...	...	10,125

## APPENDIX III.

*Cost of working certain railways in India, exclusive of supervision (management and superior staff) and general charges for the year 1897.*

Railway.	Average length worked.	Maintenance per mile per month.	Traffic, locomotive, carriage and wagon expense per train mile.
	Miles.	Rs.	Rs.
<i>Metre gauge lines.</i>			
Bengal and North-Western Railway ... ..	815	74'3	'56
Rajputana-Malwa Railway ... ..	1,872	87'1	1'06
Southern Mahratta Railway ... ..	1,556	64'0	'78
South Indian Railway ... ..	1,103	88'0	'86
<i>Narrow gauge lines.</i>			
Darjeeling-Himalayan Railway, 2' 0" ... ..	590	129 7	1'43
Morvi Railway, 2' 6" ... ..	94'3	37'2	'77
Barsi Railway, 2' 6" ... ..	21'75	57'0	'33
Gackwar's Railway, 2' 6" ... ..	78'8	52'0	1'11

## APPENDIX IV.

*Details of certain narrow gauge locomotives.*

Description of engine or name of line on which it is running.	Gauge.		Total weight in working order.	Weight on drivers.	Number of coupled axles.	Fixed wheel base.	SUITABLE TO RUN ON		Probable maximum load, excluding engine itself, at speed of 3 miles per hour.		
							Rails—weight per yard.	Curves—radius of.			
									Ins.	Tons.	Tons.
— — —	Ins.	Tons.	Tons.			Ft.Ins.	Lbs.	Ft.	Tons.	Tons.	Tons.
Barsi Light Railway (India); Kitson and Co., Leeds ...	30	29'4	19'75	4	8 3	30	175	212	122	57	
Nowshera-Dargai Railway, heavy type engines (India); Kitson and Co., Leeds ...	30	32'3	18'0	3	6 3	35	100	200	110	49	
Antofagasta and Bolivia Railway (South America); Avonside Engine Company, Bristol ...	30	28'0	22'0	3	6 9	40	120	160	91	41	
Type of engine similar to Darjeeling-Himalayan, but constructed for a 30" gauge ...	30	16'0	16'0	2	6 6	40	100	156	92	45	
Darjeeling-Himalayan Railway, heavy type engines; Sharp, Stewart and Co., Manchester ...	24	13'75	13'75	2	5 6	40	60	140	82	41	
Medium heavy type of engine made by the Décauville Company ...	30	11'5	10'0	3	4 7	20	60	113	66	33	
Nowshera-Dargai light type engines; Mann Ing, Wardle and Co., Leeds ...	30	24'3	12'0	3	6 0	25	100	93	50	18	

In calculating the loads in the above table, cylinder m. e. f. is assumed in all cases to be 90 lbs. where the adhesive power is not exceeded, the latter being taken at  $\frac{1}{3}$  the weight on drivers. Train resist ance is taken at 15 lbs. per ton, not too high a limit on a possibly roughly laid line.



## APPENDIX V.

*Average proportion of load carried to total weight of goods trains, excluding engines and brake-vans for the second-half of 1897.*

BROAD GAUGE RAILWAYS.				METRE GAUGE RAILWAYS.			
Railway.		Average gross weight in tons.	Average net load.	Railway.		Average gross weight in tons.	Average net load.
East Indian Railway ...	...	443	197	Bengal and North-Western Railway ...	...	312	73
North-Western „ ...	...	390	124	Rajputana-Malwa Railway ...	...	243	101
Eastern Bengal „ ...	...	463	139	Southern Mahratta Railway ...	...	182	68
Great Indian Peninsula Railway ...	...	314	101	South Indian Railway ...	...	165	56
Bombay, Baroda and Central India Railway ...	...	457	181	Assam-Bengal Railway ...	...	201	59
Madras Railway ...	...	367	110	Burma Railways ...	...	193	65
Average proportion ...	...	1	...	Average proportion ...	...	1	...
Load Gross weight =		2'85		Load Gross weight =		2'83	

The above data are taken from Appendix A, Part II of the Administration Report on Indian Railway for 1897-98.

### *Cost of 2' 6" and 2' 0" wagons.*

Type of wagon.	Gauge.	FLOOR DIMENSION INSIDE.			Permissible height of safe loading.	Total weight of wagon.	Total cost (approximate).	UNDER LOAD OF GRAIN BULKING, 70 C. FT. PER TON.			UNDER LOAD OF STORES BULKING, 110 C. FT. PER TON.		
		L		B				Total load.	Paying load per ton of dead weight.	Cost per ton of paying load.	Total load.	Paying load per ton of dead weight.	Cost per ton of paying load.
		Ft. In.	Ft. In.	Ft. In.		Tons.	Rs.						
Barsi Railway 8-wheel iron bogies ...	2' 6"	25' 0"	6' 6"	4' 0"	5'35"	5'35	2,700	9'20	1'72	293	5'50	1'02	500
Raipur-Dhamtari Railway 8-wheel iron bogies	2' 0"	26' 6"	5' 6"	3' 6"	4'00"	4'00	2,200	7'25	1'81	303	4'30	1'07	512
Darjeeling Railway 4-wheel trucks ...	2' 0"	10' 0"	5' 6"	3' 6"	1'35"	1'35	900	2'74	2'00	328	1'65	1'22	545

At the above prices the cost of sufficient stock to lift 100 tons of grain, etc., would be about 1,000 more for the 2' 0" than for the 2' 6" gauge.

The Raipur-Dhamtari Railway has actually been built on the 2' 6" gauge, but the wagons were originally designed for a 2' 0" and the weights are those before conversion to 2' 6". The price quoted is rather less than they actually cost in India, but is believed to be more nearly in proportion to 2' 6" wagons costing Rs. 2,700.

## PHYSICAL TRAINING IN THE NATIVE ARMY.

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BY CAPTAIN F. C. LAING, 12TH BENGAL INFANTRY.

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During the present campaign in South Africa a vast amount has been, and will be, written about the battle-training of our army and vast problems of this nature will be dealt with by all sections of the equally vast writing public. As far as the revising of the drill-book is concerned, we may be sure that the experts employed will endeavour to meet all requirements, and we may therefore leave with every confidence the battle-training of our army, British and Native, in the hands of those competent to deal with it; but in this paper I would venture to bring into prominence a subject which has, without encroaching on the drill and tactical side of the question, a direct influence on the efficiency of the native soldier as a fighting unit. This subject is briefly—physical training and exercise *outside* the authorised routine. At first sight it may be argued that the soldier with his regular drills, musketry, station duties, etc., has as much occupation as he can conveniently cope with, but I would endeavour to show that those duties in themselves are not sufficient to turn any man into the athlete that is required for the army of the present day. Before making my suggestions, let us consider the present conditions obtaining in native regiments as a whole.

The freshly captured recruit is put through a fairly severe course of physical drill, dumb-bell exercise, gymnastics, etc.; his nose is kept to the grind-stone, and, what with sufficient food and a healthy life, he finally becomes a very decently well set up young man; he is drafted into the ranks, and then, alas! deterioration is only too apt to set in. He is no longer compelled to hop about on one leg, or twist his body into uncomfortable positions, and he would be looked upon as a fool by his comrades if he did so; the consequence is that, unless compelled by what he perhaps considers needlessly harsh regulations to perform such quaint antics as bayonet exercise, etc., he prefers to sit in "aram"; and, worse luck, the majority of our sepoys do sit in "aram" as far as circumstances will permit. The result of this is that we find far too many men aged before their time; even allowing for the more rapid decline of the average oriental, we find men, young in years, but old in appearance and vigour, and we get rid of them by every means available, when by rights they should be steady soldiers, toughened by training and fit to stand all the vicissitudes of campaigning.

During the recent inspection of a certain native regiment, the General Officer Commanding called attention to the fact that many of

the men had large stomachs—a remark which, however, calculated to hurt the feelings of a British regiment would, if translated to the recipients in this case, only be a source of gratification; and it is because of this feeling of gratification that it is so hard to imbue our friend Jack Sepoy with the idea that “*aram*” is a thing to be only lightly indulged in, and that a figure inclined to “*embonpoint*” is more a matter of shame than pride. At this stage doubtless many an officer of the Indian Army will begin to pooh-pooh the idea of the sepoy, as a whole, being anything but a very fair specimen of manhood, and he will point out that in his regiment, at any rate, wrestling and sports are freely indulged in; that in another hockey is keenly played; in a third that football is always to the fore. This may be granted at the outset; in my own regiment, for example, hockey is played regularly; but to say that because certain games and sports are enjoyed by certain men, regiments, as a whole, are inclined to athletics more than to loafing would be to misstate the case most completely. Again, it will be pointed out that, after a man’s parade in the morning and afternoon—after his guards and fatigues, he is not likely to wish for or to need any further exercise during the day; but it must be remembered that in the year there are necessarily many days of leisure; the hot weather brings in a diminution of parades and manœuvres, and the regimental hospital begins to show an increase in patients. A large majority of people, if asked the reason why illness is more rife in the hot weather than the cold, would probably answer that the climate is almost entirely to blame, but they would unwittingly be somewhat wide of the mark. The hot weather is certainly trying enough, but the white man has found out quickly that, if he stays on the plains and wishes to preserve his health, the best way is to take judicious exercise and not lie all day under a *punkah* with a long drink and a cheroot.

It may be doubted whether the Asiatic is imbued with similar ideas; and, although I would in nowise put the fighting man in the same category as the remainder of the native populace, even he is so strongly imbued with the idea of “*aram*” that it is only under pressure generally that he can be induced, outside his duties, to take up any form of exercise beyond a stroll to the bazaar. However keen British officers may be in promoting sports and games, it is only a small proportion of the men who enter into them; if any particular regiment has a reputation for wrestling, sword-play, or any other native form of athletics, it is only due to a small minority, generally one or two really good men who have a few pupils and who represent the regiment in matches.

My contention and the point I am anxious to bring home to anyone interested in the question is, that good as are the men of our Indian Army, they can, and should, be made better, weedy sickly men should be eliminated and the desirable ones should be encouraged to perfect their physique in every possible way. Anyone, who has been on service, must know that certain men in a regiment are bound to give in almost at the outset; they have no specific complaint which

enables them to be cast by the doctor before starting, but a long march or two renders them unfit, and they sooner or later go on the sick list, and are lost to the country which pays them for the rest of the campaign.

This is no place to enter into a discussion as to the why and wherefore of such breakdowns and the absurdity of having soldiers who can't possibly fight, but the fact remains there are plenty of such men in our Native Army, and I would therefore endeavour to show one means, at any rate, by which physique and stamina can and should be improved.

In the cold weather generally, and at camps of exercise in particular, sufficient healthy work for the troops can be obtained for a limited period; but where the ground is unfavourable, and during the greater part of the year, systematic exercise is never indulged in, the sepooy may be hard-worked or over-worked for one or two days in the week, while for the rest he has practically little or nothing to keep his liver in working order.

We all know what life is like at a large school in England; we all know the boy who rushes into every form of game; we also know the youngster who skulks and prefers to loiter round the "tuck-shop" to joining in any out-door amusement of any kind. To discourage the skulker, and to bring up the boy in the way he should go, it has become the universal custom to make games of some sort compulsory, with the beneficial result that the would-be loafer is often turned into a creditable cricket or football player, and the youth, who previously preferred the surreptitious smoke, discovers that he can get more fun out of one game at cricket than many cigarettes and "slogs of cake."

The British youngster is trained from childhood to healthy exercise, and usually, if there is nothing radically wrong with him, he cherishes his love of out-door games to the end of his life; the moral of this is that England's greatness is due chiefly to the Englishman's love of manly sport. It is all very well to say that mind is above matter, and that greatness depends on brains; but, unless the brains are backed up by courage and strength, they are useless; that Great Britain owns the largest share of the earth may be theoretically due to her general superiority, but it is primarily and actually due to the strength of her arm.

Such truisms, as the above, are simply mentioned to show how much depends on the physical training of the manhood of a nation; and this being granted, I would venture to state that the native soldier is not sufficiently trained physically to get the best qualities out of him; and to do this properly, some system should be devised by which he should be either persuaded or compelled to put himself into thorough training. We are confronted at the outset by all sorts of possible and probable opposition; and though it may be hard to introduce reforms when sepoys are of some years' service, yet there is ample scope for training the recruit and keeping him in condition when he is drafted into the ranks. No scheme is of much avail unless

it can show some detail as to its carrying out, and I therefore make the following suggestions as a sort of platform upon which can be built up a workable system :—

*For recruits.*

(1) The recruit's course of physical training would be improved by the complete adoption of the Sandow system which is wholly admirable and far better suited to developing the muscles than that laid down in the drill-book which is incomplete and appears to be partly taken from Sandow's book and partly from other sources ; the dumb-bells, as used, are too heavy, and the bar-bells could be dispensed with.

The whole secret of successful physical culture, as mentioned in all Sandow's instructions, is concentration of mind on each exercise, and it is extremely doubtful now whether the average recruit puts any will into his work at all.

(2) If the Sandow system was *properly* adopted, gymnastics would not be needful ; the plant of the latter is expensive and cumbersome, and the money saved by not buying the apparatus could be better applied in other ways, such as purchasing hockey sticks, cricketing gear, footballs, etc.

(3) In addition to the recruit's ordinary training, he should be made to play hockey, football, or some similar game at least twice a week *instead* of afternoon drill ; it is a pleasant change from routine ; he doesn't lose much as a soldier, and he may gain a liking for a manly game which otherwise would never appeal to him.

*For trained soldiers.*

(1) The recruit, on being drafted into the ranks, should be made to state what particular form of athletics he prefers ; he need not be tied down to any particular form so long as he went in for one or more of the many which are open to him ; some men would, for example, prefer their native wrestling to any English game.

(2) While giving each man every freedom in choosing his form of athletics, he should be distinctly made to understand that under no circumstances, other than duty or illness, would he be allowed to shirk.

(3) To prevent, as far as possible, athletics becoming too much of a toil, they might be carried on only four times in the week, the object being to make every sepoy more or less of an athlete whether he liked it or not, but at the same time prevent, as far as possible, making his training unpleasant and a tax on his temper.

(4) Whatever the form of out-door exercise, it should be for not less than one hour at a time.

(5) To encourage the men the British officers can do much by personal example and by entering into the various games themselves ; every native regiment has a percentage, however small, of able-bodied British officers ; and it would not require much pressure, considering what keenness there is generally among them, to induce them to forego their own amusements once or twice a week to superintend and join

in the games their men were playing. One may count on four British officers at least in each regiment who are fairly athletic, and this would give one superintending officer daily, always remembering "the more the merrier."

(6) Inter-company teams of every kind might eventually be organised, which would give the stimulus of competition; following this, inter-regimental matches could be arranged, and probably in time a system of prize-giving could be added.

To be the best shooting regiment in India is doubtless gratifying, but how much greater the "Kudos" for a regiment to be the best shots, best cricketers, football and hockey players; in brief to be the champion all round regiment.

One difficulty at present would be the probable opposition of the native commissioned and non-commissioned ranks; the latter possibly take their cue from the former, but it is any way hard to get the average native officer to take any proper interest in games; true, a few do in the infantry and probably more in the cavalry where polo is encouraged; but it is to be feared that the majority look upon any form of unnecessary exercise as beneath their dignity; and hence we find so often the smart non-commissioned officer, when promoted, developing into the paunchy native officer a good fellow enough, but physically incapable of doubling more than a few hundred yards, and quite unprepared to tackle a hill or climb a wall at a moment's notice.

There seems now a days a tendency, however, to encourage the young man in preference to the older; and such being the case, we may take for granted that gradually the commissioned and non-commissioned ranks will be entirely filled by men in their prime; and for men of this stamp there is no excuse if they are not physically fit—of course leaving out vicissitudes of climate.

A further objection, which is likely to be raised against the above ideas, is the compulsory nature of the games and exercises, and this would at first undoubtedly be a serious obstacle to overcome; at the same time it can hardly be sufficiently insisted upon that if we are to place the Native Army on an equality with European armies apart from drill and armament, further physical culture is indispensable.

The material is already good and likely to be better. All that is wanted is stimulus and example to perfect it; something more is required than smart appearance on parade; complaints are often made by staff corps officers that few opportunities are given them to get into thorough touch with their men; and our system lends some colour to such remarks, because, with the exception of the regimental staff, British officers have few chances, of being with the men except on parade and at musketry. The double company system may help, but the introduction of games would bring officers into closer contact with their men, and a better and more friendly feeling between them would result.

The example of British regiments can well be followed, but difficulties are greater of course, because Mr. Thomas Anderson is more naturally to out-door sports than his brother Jack. Nevertheless I feel confident that if once a start were made on the lines suggested, in a few years we should find a marked improvement in the physique of the Native Army; good bodily health is essential by proper exercise and good health means increased power of endurance, better shooting, better drill, better nerves, and general immunity from serious illness of the staff corps must surely be put down to his early training and love of out-door exercise; the recruit and trained soldier has no objection to it is only the cultivation of his taste for some form of sport which is deficient. Like a certain type of English school boy already mentioned, he simply wants the impetus given by compulsion; some go to games by choice, others don't; it is for the latter we have to regulate; and, finally, we may be quite sure that if there are men in the Native Army, who are not fitted for the playing of games, they are they fitted for the great game of war.

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## APPENDIX V.

*Average proportion of load carried to total weight of goods train -  
excluding engines and brake-vans for the second-half of 1917*

BROAD GAUGE RAILWAYS.			METRE GUAGE RAILWAYS.		
Railway.	Average gross weight in tons.	Average net load.	Railway.	Average gross weight in tons.	Average net load.
East Indian Railway ...	443	197	Bengal and North-Western Railway ...	211	111
North-Western " ...	300	124	Rajputana-Malwa Railway ...	261	100
Eastern Bengal " ...	463	130	Southern Mahratta Railway ...	181	80
Great Indian Peninsula Railway ...	316	121	South Indian Railway ...	173	80
Bombay, Baroda and Central India Railway ...	457	181	Assam-Bengal Railway ...	20	8
Madras Railway ...	367	110	Burma Railways ...	11	5
Average proportion ...	1	...	Average proportion ...	1	...
Load Gross weight =	215		Load Gross weight =	11	

The above data are taken from Appendix A, Part II of the Administration Report on Indian Railways for 1917-18.

*Cost of 2' 6" and 2' 0" wagons.*

Type of wagon.	Gauge.	Dimensions in feet.		Form as to height of side boards.	Total weight of wagon.	Total cost (approximate).	Unit cost of 2' 6" wagon.			Unit cost of 2' 0" wagon.		
		L.	B.				Rs.	Ts.	P.	Rs.	Ts.	P.
Broad Railway & wheel iron wagons ...	5	6	35	0	6	4	0	5	33	2	30	0
Narrow Railway & wheel iron wagons ...	3	0	25	0	3	0	4	00	4	30	7	35
Narrow Railway & wheel iron wagons ...	3	0	25	0	3	0	4	00	4	30	7	35
Narrow Railway & wheel iron wagons ...	3	0	25	0	3	0	4	00	4	30	7	35
Narrow Railway & wheel iron wagons ...	3	0	25	0	3	0	4	00	4	30	7	35
Narrow Railway & wheel iron wagons ...	3	0	25	0	3	0	4	00	4	30	7	35
Narrow Railway & wheel iron wagons ...	3	0	25	0	3	0	4	00	4	30	7	35
Narrow Railway & wheel iron wagons ...	3	0	25	0	3	0	4	00	4	30	7	35
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Narrow Railway & wheel iron wagons ...	3	0	25	0	3	0	4	00	4	30	7	35
Narrow Railway & wheel iron wagons ...	3	0	25	0	3	0	4	00	4	30	7	35
Narrow Railway & wheel iron wagons ...	3	0	25	0	3	0	4	00	4	30	7	35
Narrow Railway & wheel iron wagons ...	3	0	25	0	3	0	4	00	4	30	7	35
Narrow Railway & wheel iron wagons ...	3	0	25	0	3	0	4	00	4	30	7	35
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Narrow Railway & wheel iron wagons ...	3	0	25	0	3	0	4	00	4	30	7	35
Narrow Railway & wheel iron wagons ...	3	0	25	0	3	0	4	00	4	30	7	35
Narrow Railway & wheel iron wagons ...	3	0	25	0	3	0	4	00	4	30	7	35
Narrow Railway & wheel iron wagons ...	3	0	25	0	3</							

At the above prices the cost of loading and unloading of goods, etc., would be about 1/2 paise per ton for the 2' 6" wagon and 1/4 paise for the 2' 0" wagon.

The Madras Railway has not yet been built on the 2' 6" gauge, but the Government are considering the possibility of building it on the 2' 6" gauge. The cost of building it on the 2' 6" gauge is estimated to be about 1/2 paise per ton for the 2' 6" wagon and 1/4 paise for the 2' 0" wagon.

## PHYSICAL TRAINING IN THE NATIVE ARMY.

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BY CAPTAIN F. C. LAING, 12TH BENGAL INFANTRY.

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During the present campaign in South Africa a vast amount has been, and will be, written about the battle-training of our army and vast problems of this nature will be dealt with by all sections of the equally vast writing public. As far as the revising of the drill-book is concerned, we may be sure that the experts employed will endeavour to meet all requirements, and we may therefore leave with every confidence the battle-training of our army, British and Native, in the hands of those competent to deal with it; but in this paper I would venture to bring into prominence a subject which has, without encroaching on the drill and tactical side of the question, a direct influence on the efficiency of the native soldier as a fighting unit. This subject is briefly—physical training and exercise *outside* the authorised routine. At first sight it may be argued that the soldier with his regular drills, musketry, station duties, etc., has as much occupation as he can conveniently cope with, but I would endeavour to show that those duties in themselves are not sufficient to turn any man into the athlete that is required for the army of the present day. Before making my suggestions, let us consider the present conditions obtaining in native regiments as a whole.

The freshly captured recruit is put through a fairly severe course of physical drill, dumb-bell exercise, gymnastics, etc.; his nose is kept to the grind-stone, and, what with sufficient food and a healthy life, he finally becomes a very decently well set up young man; he is drafted into the ranks, and then, alas! deterioration is only too apt to set in. He is no longer compelled to hop about on one leg, or twist his body into uncomfortable positions, and he would be looked upon as a fool by his comrades if he did so; the consequence is that, unless compelled by what he perhaps considers needlessly harsh regulations to perform such quaint antics as bayonet exercise, etc., he prefers to sit in "aram"; and, worse luck, the majority of our sepoys do sit in "aram," as far as circumstances will permit. The result of this is that we find far too many men aged before their time; even allowing for the more rapid decline of the average oriental, we find men, young in years, but old in appearance and vigour, and we get rid of them by every means available, when by rights they should be steady soldiers, toughened by training and fit to stand all the vicissitudes of campaigning.

During the recent inspection of a certain native regiment, the General Officer Commanding called attention to the fact that many of

the men had large stomachs—a remark which, however, calculated to hurt the feelings of a British regiment would, if translated to the recipients in this case, only be a source of gratification; and it is because of this feeling of gratification that it is so hard to imbue our friend Jack Sepoy with the idea that “*aram*” is a thing to be only lightly indulged in, and that a figure inclined to “*embonpoint*” is more a matter of shame than pride. At this stage doubtless many an officer of the Indian Army will begin to pooh-pooh the idea of the sepoy, as a whole, being anything but a very fair specimen of manhood, and he will point out that in his regiment, at any rate, wrestling and sports are freely indulged in; that in another hockey is keenly played; in a third that football is always to the fore. This may be granted at the outset; in my own regiment, for example, hockey is played regularly; but to say that because certain games and sports are enjoyed by certain men, regiments, as a whole, are inclined to athletics more than to loafing would be to misstate the case most completely. Again, it will be pointed out that, after a man’s parade in the morning and afternoon—after his guards and fatigues, he is not likely to wish for or to need any further exercise during the day; but it must be remembered that in the year there are necessarily many days of leisure; the hot weather brings in a diminution of parades and manoeuvres, and the regimental hospital begins to show an increase in patients. A large majority of people, if asked the reason why illness is more rife in the hot weather than the cold, would probably answer that the climate is almost entirely to blame, but they would unwittingly be somewhat wide of the mark. The hot weather is certainly trying enough, but the white man has found out quickly that, if he stays on the plains and wishes to preserve his health, the best way is to take judicious exercise and not lie all day under a *punkah* with a long drink and a cheroot.

It may be doubted whether the Asiatic is imbued with similar ideas; and, although I would in nowise put the fighting man in the same category as the remainder of the native populace, even he is so strongly imbued with the idea of “*aram*” that it is only under pressure generally that he can be induced, outside his duties, to take up any form of exercise beyond a stroll to the bazaar. However keen British officers may be in promoting sports and games, it is only a small proportion of the men who enter into them; if any particular regiment has a reputation for wrestling, sword-play, or any other native form of athletics, it is only due to a small minority, generally one or two really good men who have a few pupils and who represent the regiment in matches.

My contention and the point I am anxious to bring home to anyone interested in the question is, that good as are the men of our Indian Army, they can, and should, be made better, weedy sickly men should be eliminated and the desirable ones should be encouraged to perfect their physique in every possible way. Anyone, who has been on service, must know that certain men in a regiment are bound to give in almost at the outset; they have no specific complaint which

enables them to be cast by the doctor before starting, but a long march or two renders them unfit, and they sooner or later go on the sick list, and are lost to the country which pays them for the rest of the campaign.

This is no place to enter into a discussion as to the why and wherefore of such breakdowns and the absurdity of having soldiers who can't possibly fight, but the fact remains there are plenty of such men in our Native Army, and I would therefore endeavour to show one means, at any rate, by which physique and stamina can and should be improved.

In the cold weather generally, and at camps of exercise in particular, sufficient healthy work for the troops can be obtained for a limited period; but where the ground is unfavourable, and during the greater part of the year, systematic exercise is never indulged in, the sepoy may be hard-worked or over-worked for one or two days in the week, while for the rest he has practically little or nothing to keep his liver in working order.

We all know what life is like at a large school in England; we all know the boy who rushes into every form of game; we also know the youngster who skulks and prefers to loiter round the "tuck-shop" to joining in any out-door amusement of any kind. To discourage the skulker, and to bring up the boy in the way he should go, it has become the universal custom to make games of some sort compulsory, with the beneficial result that the would-be loafer is often turned into a creditable cricket or football player, and the youth, who previously preferred the surreptitious smoke, discovers that he can get more fun out of one game at cricket than many cigarettes and "slogs of cake."

The British youngster is trained from childhood to healthy exercise, and usually, if there is nothing radically wrong with him, he cherishes his love of out-door games to the end of his life; the moral of this is that England's greatness is due chiefly to the Englishman's love of manly sport. It is all very well to say that mind is above matter, and that greatness depends on brains; but, unless the brains are backed up by courage and strength, they are useless; that Great Britain owns the largest share of the earth may be theoretically due to her general superiority, but it is primarily and actually due to the strength of her arm.

Such truisms, as the above, are simply mentioned to show how much depends on the physical training of the manhood of a nation; and this being granted, I would venture to state that the native soldier is not sufficiently trained physically to get the best qualities out of him; and to do this properly, some system should be devised by which he should be either persuaded or compelled to put himself into thorough training. We are confronted at the outset by all sorts of possible and probable opposition; and though it may be hard to introduce reforms when sepoys are of some years' service, yet there is ample scope for training the recruit and keeping him in condition when he is drafted into the ranks. No scheme is of much avail unless

it can show some detail as to its carrying out, and I therefore make the following suggestions as a sort of platform upon which can be built up a workable system :—

*For recruits.*

(1) The recruit's course of physical training would be improved by the complete adoption of the Sandow system which is wholly admirable and far better suited to developing the muscles than that laid down in the drill-book which is incomplete and appears to be partly taken from Sandow's book and partly from other sources ; the dumb-bells, as used, are too heavy, and the bar-bells could be dispensed with.

The whole secret of successful physical culture, as mentioned in all Sandow's instructions, is concentration of mind on each exercise, and it is extremely doubtful now whether the average recruit puts any will into his work at all.

(2) If the Sandow system was *properly* adopted, gymnastics would not be needful ; the plant of the latter is expensive and cumbersome, and the money saved by not buying the apparatus could be better applied in other ways, such as purchasing hockey sticks, cricketing gear, footballs, etc.

(3) In addition to the recruit's ordinary training, he should be made to play hockey, football, or some similar game at least twice a week *instead* of afternoon drill ; it is a pleasant change from routine ; he doesn't lose much as a soldier, and he may gain a liking for a manly game which otherwise would never appeal to him.

*For trained soldiers.*

(1) The recruit, on being drafted into the ranks, should be made to state what particular form of athletics he prefers ; he need not be tied down to any particular form so long as he went in for one or more of the many which are open to him ; some men would, for example, prefer their native wrestling to any English game.

(2) While giving each man every freedom in choosing his form of athletics, he should be distinctly made to understand that under no circumstances, other than duty or illness, would he be allowed to shirk.

(3) To prevent, as far as possible, athletics becoming too much of a toil, they might be carried on only four times in the week, the object being to make every sepoy more or less of an athlete whether he liked it or not, but at the same time prevent, as far as possible, making his training unpleasant and a tax on his temper.

(4) Whatever the form of out-door exercise, it should be for not less than one hour at a time.

(5) To encourage the men the British officers can do much by personal example and by entering into the various games themselves ; every native regiment has a percentage, however small, of able-bodied British officers ; and it would not require much pressure, considering what keenness there is generally among them, to induce them to forego their own amusements once or twice a week to superintend and join

in the games their men were playing. One may count on four British officers at least in each regiment who are fairly athletic, and this would give one superintending officer daily, always remembering "the more the merrier."

(6) Inter-company teams of every kind might eventually be organised, which would give the stimulus of competition; following this, inter-regimental matches could be arranged, and probably in time a system of prize-giving could be added.

To be the best shooting regiment in India is doubtless gratifying, but how much greater the "Kudos" for a regiment to be the best shots, best cricketers, football and hockey players; in brief to be the champion all round regiment.

One difficulty at present would be the probable opposition of the native commissioned and non-commissioned ranks; the latter possibly take their cue from the former, but it is any way hard to get the average native officer to take any proper interest in games; true, a few do in the infantry and probably more in the cavalry where polo is encouraged; but it is to be feared that the majority look upon any form of unnecessary exercise as beneath their dignity; and hence we find so often the smart non-commissioned officer, when promoted, developing into the paunchy native officer a good fellow enough, but physically incapable of doubling more than a few hundred yards, and quite unprepared to tackle a hill or climb a wall at a moment's notice.

There seems now a days a tendency, however, to encourage the young man in preference to the older; and such being the case, we may take for granted that gradually the commissioned and non-commissioned ranks will be entirely filled by men in their prime; and for men of this stamp there is no excuse if they are not physically fit—of course leaving out vicissitudes of climate.

A further objection, which is likely to be raised against the above ideas, is the compulsory nature of the games and exercises, and this would at first undoubtedly be a serious obstacle to overcome; at the same time it can hardly be sufficiently insisted upon that if we are to place the Native Army on an equality with European armies apart from drill and armament, further physical culture is indispensable.

The material is already good and likely to be better. All that is wanted is stimulus and example to perfect it; something more is required than smart appearance on parade; complaints are often made by staff corps officers that few opportunities are given them to get into thorough touch with their men; and our system lends some colour to such remarks, because, with the exception of the regimental staff, British officers have few chances, of being with the men except on parade and at musketry. The double company system may help, but the introduction of games would bring officers into closer contact with their men, and a better and more friendly feeling between them would result.

The example of British regiments can well be followed ; the difficulties are greater of course, because Mr. Thomas Atkins takes more naturally to out-door sports than his brother Jack Sepoy ; but nevertheless I feel confident that if once a start were made on the lines suggested, in a few years we should find a marked improvement in the physique of the Native Army ; good bodily health is ensured by proper exercise and good health means increased power of endurance, better shooting, better drill, better nerves. The general immunity from serious illness of the staff corps officer must surely be put down to his early training and love of out-door exercise ; the recruit and trained soldier has enough food ; it is only the cultivation of his taste for some form of sport which is deficient. Like a certain type of English school boy already mentioned, he simply wants the impetus given by compulsion ; some take to games by choice, others don't ; it is for the latter we have to legislate ; and, finally, we may be quite sure that if there are men now in the Native Army, who are not fitted for the playing of games, still less are they fitted for the great game of war.

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THE SEAL OF THE  
GREAT KING OF MISSOURI

## A RELIC OF THE BLOCKADE OF TRICHINOPOLY, 1752-1753.

BY C. DALTON, ESQ.

The accompanying print is taken from an original document found on a sepoy employed by the Regent of Mysore in 1752 to gain an entrance into the beleaguered town of Trichinopoly and shoot Captain John Dalton, the Commandant of the Garrison. The document, or rather passport, is in the Mahratta characters and language, and has been translated by Mr. Pathak, a Mahratta man, Assistant to Professor Lewis Rice at Bangalore.

### *Translation.*

"A passport issued by Muraraji Hindurao Ghorapade (Persian titles omitted) :—

One horseman and three musketeers with three or four servants are travelling from Pudechery to Channapatana. On the road they should not be obstructed without reason, and they should be conducted safely. The above should be known as a strict order and should be carried out as it is written. Dated the 22nd day of the month of Jilheja, the year 6. The end."

Professor Rice, in a letter, dated 26th March 1896, to Professor Rhys Davids, of the Royal Asiatic Society, London, says :—

"The document is dated on the 22nd of Zihaji (March) in the year 6, perhaps 1166 of the Hijra, which would be 1752 A.D. The Chief, in whose name the grant is given, was no doubt Morâri Rao, who was captured by Haidar Ali in 1775, and sent to Kabbâllurga, where he died."

The endorsement in Captain John Dalton's own hand, on the back of this passport, tells the fate of the sepoy sent as an advance guard to carry out his master's treacherous scheme of assassination :—

"Commission under the great seal of Misoor found on the sepoy executed at Trichinopoly for attempting to seduce the Commanding Officer at Chindominy Gate and shoot the Commander of the Garrison.—*John Dalton.*"

This interesting old document is now in the hands of Mr. Charles Dalton, a great grandson of the gallant Captain John Dalton, who so ably held Trichinopoly against the French and their native allies in 1752-1753. This defence is a matter of Indian history and has been fully recorded by Robert Orme, Sir John Malcolm, Richard Cambridge, Colonel Malleison, and other well-known writers. A memoir of Captain John Dalton was published in 1886 by the present writer.

## SOME FOREIGN ARTICLES OF SPECIAL INTEREST.

(Contributed by the Intelligence Branch.)

## THE BAYONET.

*Being a précis of an article by Sub-Lieutenant Vitale, 40th (Italian) Infantry, published in "L'Esercito Italiano" of the 6th, 8th and 11th October 1899.*

The writer takes, as his theme, the following proposition:—

Although it is an axiom, continually inculcated on the soldier, that musketry fire has for its object to shake the enemy's infantry and prepare the way for the final assault, yet military experts of to-day seem to be more and more convinced of the almost complete uselessness of the bayonet in these days of accurate and far-carrying arms of precision; and they explain its retention in the service by such misty arguments as "morale," its use by night or in fogs, surprises, etc.

The writer is not of this opinion, and proceeds to show how such a statement—apart from its foundation on true or false premises—may cause harm to all, but especially to the infantry soldier, who, in a future war, will not be prepared, not only physically, but unfortunately also morally, to assault a position with the bayonet. The soldier of to-day expects his musketry fire alone to give him the victory. If to-morrow he is ordered to charge with the bayonet, he will say to himself that something has gone wrong; that the attack has failed; since he must also charge with the bayonet; that the enemy is stronger than his side. It is clear that he will not go to the charge with that spirit which is absolutely necessary to success.

What does the infantry soldier think of his bayonet or sword bayonet? That when wearing it, without his rifle, he is not entirely unarmed; that it is an article which he fixes on his rifle to perform the bayonet exercise, or when on sentry, or sometimes at inspections. The bayonet exercise and even the "attack and defence" which many regard as an obsolete exercise (and indeed it is so, as it, in no way, answers to any eventuality on service) engenders in the mind of the soldier a misguided notion that should it come to close quarter fighting with the bayonet, all he has to do is to come to the "engage" and perform one or two motions which will at once give him the victory. What will he think when he finds himself a unit in a confused line tending to close and thicken towards the centre, advancing at different rates of speed? Now seeming to hesitate, anon making a spurt, slowing

down to wait for a wing and finally coming to the shock in a natural and unavoidable disorder? He will think "Things are going all wrong; we are 'clubbed' and in disorder," and he will lose faith in his leaders. Nor would he be wrong. Has he ever, in time of peace, on parade, seen a similar disorder? So natural and so admirable because it is so true? Has he ever been taught a species of bayonet exercise consisting in an irregular rush, having for its object one point with the bayonet at a scarcely resisting object? No, all he has been taught is to advance and retire, to stamp, and to point at vacant air with his bayonet. In the cavalry the trooper is indeed taught the use of his sabre. First on foot, in a position resembling the seat on the saddle, he goes through certain exercises which loosen his wrist and strengthen his forearm. Then on horseback he repeats his exercise, making his sabre-cuts at a machine which, if the cut be *true*, replies with a detonation; but is silent if the edge of the sabre has not been properly directed. Why cannot something similar be done with the bayonet in the infantry? It would be absurd to deny to musketry fire its extreme importance in the attack; but it would be equally absurd to suppose that fire *only* is invariably going to be the only factor of success in the attack of a position. Hence the extreme importance of teaching the soldier more about the use of his bayonet.

The writer also deprecates the custom of the service of always fixing bayonets against charging cavalry. It is—he says—curious that against infantry the bayonet is fixed too late—much too late sometimes; whilst against cavalry it is *invariably* fixed, when in this latter case it is quite useless to do so. Nay, it is fatal, because the act of fixing bayonets, which takes some time in peace, and will take longer in war, is so much precious time deducted from infantry fire which is the only defence against charging cavalry. Twenty seconds employed in fixing bayonets means hundreds of shots lost; whereas it is well known that against charging cavalry it is necessary to employ as much rapid magazine fire as possible.

Here the writer comes to the principal point in his argument. It has been said by the majority of experts in military matters that formerly the bayonet charge was indispensable, because small arms had but little precision, a high trajectory, and were not accurate, or not uniform in accuracy. Now—they add—infantry fire has attained an extraordinary efficacy, the battle will be decided by fire alone, and therefore the bayonet has become nearly, if not entirely, useless. The writer contends that the argument is not exact, because it rests on inexact premises. The efficacy of infantry fire *has not* increased to the extent that is claimed for it. That a modern rifle of small calibre is infinitely superior in precision and extent of range, etc., to the old rifles, is indubitable; but the increased efficacy claimed for it is much diminished by the fact that the vulnerability of the targets is, under modern conditions, not increased in proportion. For increase in the vulnerability of the target we have (a) more ammunition can be carried; the soldier has more lives in his power; (b) increased rapidity of fire; (c) a flat trajectory increasing the breadth of the dangerous zone; (d) increased accuracy, *i.e.*, when the distance is known, or accurately

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judged, or found; (e) increased extent of range; the enemy is not secure even at 2,000 metres; though good shooting at such ranges is rare, still it must be taken into account; (f) increased penetration; one bullet may kill several men standing in its line of flight; also some cover, such as trees, etc., is no longer any cover; (g) hits from ricochets are more numerous and more deadly owing to the shape of the bullet and because it falls at a more acute angle.

Let us now examine the circumstances that tend to *decrease* the vulnerability of the target, with modern arms of precision:—(a) The advantage of increased number of cartridges is neutralised by fire commencing at much longer distances, by the increased rapidity of the same, and by magazine fire; hence the soldier will find himself short of ammunition, if anything, sooner than was the case formerly. (b) If this increased expenditure necessarily meant an increased number of hits on the target, the advantage would still be great; but it is well known that rapidity of fire in the heat of action is an element of detraction from accuracy of aim. The soldier feverishly fills and empties his magazine and makes but few hits. The accuracy does not grow, as it should, in proportion as the distance is diminished; but the reverse may be expected with a *war target*, as the soldier is not flurried or excited at long distances, but is undeniably so as he nears the enemy. (c) The flat trajectory is the greatest factor in the increased accuracy of modern arms, yet this very flatness of trajectory is often the cause of immunity from harm to the target aimed at. This is the case with troops in shelter trenches. With the former high trajectory, a bullet grazing the top of a parapet could still hit troops sheltered behind it. With the modern flat trajectory the zone of immunity behind the shelter-trench is increased. It follows that in future wars an increased use will be made of shelter-trenches, and this will be no inconsiderable item among the causes that militate against the much talked of increase of efficacy of fire. It might be argued that the penetration of the bullet being great, shelter-trenches will have to be made with much thicker parapets, but the writer answers that the penetration of the rifle-bullet now in use is .98 of a metre, in loose earth at 200 metres. It will therefore not be difficult to run up improvised cover, especially as the shelter-trench need not be so deep, considering the flatness of trajectory, as it has been the practice to make it. (d) The greater accuracy of modern arms is a real advantage; but only in that it affects the *vertical* dispersion of fire. The *lateral* dispersion of collective fire in war, which was insufficient with the old arms, is now even less. Add to this the tendency of every soldier to aim at the centre of any target, and it will be seen that in future wars the flanks of any formation of troops will suffer little, and less than they formerly did. (e) The increased carrying power of modern rifles is no great advantage, and this will be easily understood. At great distances objects are imperfectly seen, and when they are seen and fired at by good marksmen, few hits are made owing to the flat trajectory and increased dispersion of fire. Besides, the judging or *finding* of long distances is frequently attended with gross errors. We shall, however, see

to what the accuracy of long distance volleys is reduced when we examine the "Tables of vulnerability" in the Musketry Regulations. (f) Increased penetration, as we have seen, has no great influence on the normal shelter-trench. If it is true that a bullet would perforate three or four men in its line of flight, on the other hand it is difficult to find men in such formation—on purpose, as it were, to get perforated. At short and medium distances the bullet will find thin extended lines. At long distances it might find deeper formations, but the bullet is then half spent and its angle of fall has increased, therefore its penetration is diminished. (g) Ricochets are numerous, and this is a real advantage; but it is as well to note that they rise at such different angles and in so many strange directions that not so many of them hit the target as is popularly supposed.

Finally, the writer invites attention to the "Tables of vulnerability" in the Italian Musketry Regulations, by which it appears that on a target representing men standing, at a known distance of 600 metres, the percentage of hits to rounds fired is 38·4—at 1,300 metres 15·7 and at 2,000 metres 4·7. If these percentages were obtained in actual warfare, then indeed the bayonet might be ostracised; but everyone knows that the results in actual war would be very inferior to those obtained on the range. They have been differently estimated at from  $\frac{1}{10}$  to  $\frac{1}{100}$  of range results. Taking the latter as the most approximate, we would have at 600 metres 3·8, at 1,300 1·6 and at 2,000 0·5 per cent. But this is at men *standing*, and men rarely stand in war. At men *kneeling* we would have respectively 2·5, 1·0 and 0·3 per cent., and at men lying down 1·0, 0·4 and 0·1 per cent. Again, this is at *known* distances. Consulting always the "Tables," we find that at unknown distances the percentage of hits would be at 600 metres 1·5, at 1,300 0·00 and at 2,000 0·00!

The arm that really suffers most from the improved arms of precision is cavalry. They cannot diminish their height, nor can they adopt dispersed formations, as their power lies in the shock tactics of masses. Yet the infantry soldier invariably fixes bayonets against them, though his fire is more than sufficient to keep them at a distance.

Referring then to history, the writer points out that neither fire-arms nor greatly improved fire-arms have had the effect of increasing the numbers of the enemy that are killed; but that rather the reverse is the case. At Cannæ the Romans had 70,000 horsemen killed. At Borodino the bloodiest battle fought since the invention of fire-arms—the losses in killed were much less. Still less were they at Gravelotte, St. Privat. Yet from Borodino to St. Privat we had advanced from flint-locks to the Dreyse and, better still, the Chassepot! Why then talk of the bayonet being obsolete? It was not obsolete at St. Privat.

To conclude, the writer adds that the shock of a bayonet charge will, as heretofore, be in the majority of cases the turning point of a battle much more when it has been vigorously prepared by an intelligent use of artillery and musketry fire. Fire and shock are the two

essentials, and one cannot do without the other, and therefore it is not well that the infantry soldier should be thoroughly taught the use of one only of his arms, while with the other he is only taught to execute a few meaningless parade movements. It is only by thoroughly teaching him *both* that he will acquire that confidence in himself and his arms which is a most essential element in the value or otherwise of an army.

### MOTOR CARRIAGES FOR USE IN THE FIELD.

The rapid development of the automobile industry in recent years, and the astonishing performances by which its results surprise us from day to day, especially in the cities of our own and other lands, have repeatedly brought into the foreground the question of utilising automobiles for military purposes.

There is no lack of exaggerated representations of the adaptability of motor carriages; in fact, there are enthusiasts in France, for example, who dream, and even seriously speak of automobile road batteries, of automobile artillery in entrenched camps and fortresses, and so on, which might be entrusted to the municipal officials in exposed frontier towns, of carriages drawn by motor cycles for the transport of smaller detachments, and more of the same description.

It has a beneficial and sobering counter-effect to such fanciful imaginings, when a skilful and matter-of-fact officer like the Italian Major of Engineers, Mirandoli, reduces the question how far the mechanical motor is capable in the present state of its development to supersede animal draught to the fair level of plain experiments and facts. His article on this subject published in December 1898 in the "*Rivista-di-Artiglieria e Genio*" is to a large extent reproduced in the "*Revue du Cercle Militaire*" by the French Captain Bardonmont.

The motor carriage question has a real importance for the kingdom of Italy, more than for other military states. The want of horses and mules for mobilisation purposes is only too clear in our own land, although the age of purchase has already been reduced to four years. Thus it would be all the more advisable to replace animal draught by motor carriages.

Major Mirandoli therefore also puts the appropriate question, whether automobiles on ordinary roads alter the conditions of mechanical draught, and whether they are capable of performing in a more perfect manner than traction engines the following specially military tasks:—(1) Supplementing the railway service, from the point where the latter must cease, by an effective means of transport. (2) Substituting for animal draught in field parks and ammunition columns an equally tractable means of transport. The author has no hesitation in answering both questions in the negative. We will follow his argument. Of the two most important elements which come under consideration—Roads and Vehicle—the former has the greater significance.

In nearly all civilised countries the great arteries of communication are similar.

Wear resisting ground work, regular surfaces, metallised at certain seasons, gradients not over  $10^{\circ}$ , paved at the approaches to towns. Similarly the other roads described as "drivable" present, alike everywhere, the same general conditions as the foregoing, but have a less good foundation and often have gradients of  $12^{\circ}$  or more. The latter less favourable points fundamentally affect military utility, regard must be had to the deterioration of the roads from excessive traffic in time of war, and the interruption of the periodical repairs usually made in time of peace. Thus roads require from any automobile system two characteristics.

Lightness and power of draught—conditions which are mutually antagonistic. The first requires light vehicles, big wheels with smooth fellyes; the second a comparatively considerable weight, great means of producing power, strong wheels with roughed fellyes.

If both conditions are to be fulfilled, then like railways and river navigation, the motor must be rejected as a means of transport.

Any other solution only leads to a compromise which may produce practical results under favourable circumstances, but cannot be reckoned upon in war where the unforeseen plays so great a part.

Hitherto engineers have regarded the perfecting of the automobile as the difficulty to be overcome in solving the problem, and have thus avoided the influence of the chief factor.

Bicycles have been employed with much ingenuity for draught; motors of great speed and with powerful generators have been invented, and thereby good results have been attained in rapidity, and more or less reliable traffic, on first class roads. These results have, however, been by no means decisive.

The competitions instituted in Paris in 1897 and 1898 and in Liverpool in 1898 with automobiles for heavy draught have convincingly proved the fact.

The trials held in Paris in 1897 comprised 6 runs, none of them more than 66 kilometers, carried out on roads with gradients not exceeding  $10^{\circ}$ . Out of 15 entries, 10 vehicles put in an appearance, 7 of them took part in the run. There were no serious breakdowns, still there were a number of slight damages, loss of minor components, lengthening of chains, and so on. The speed varied from 7 to 11 kilometers an hour, the load amounted to 2,500 kilogrammes, while the total weight of the vehicles was two or three times that of their loads. The Parisian trials of 1898 gave only slightly differing results. Of 7 automobiles that put in an appearance, 3 failed to reach the goal.

In Liverpool only 4 cars started, and they were subjected to a four times repeated trial on courses of 58 kilometers.

The speed was from 6.5 to 9.5 kilometers in an hour, only the lightest car attained 13 kilometers.



All suffered damages. When one considers that automotors that take part in such competitions are constructed with peculiar care, are driven by experts, and exercise their capabilities to the utmost, then the results of such trials will be viewed with all the more caution from a military point of view.

The automobile cars which took part in the above-mentioned trials represented two different types in their construction.

The English vehicles resemble the big trucks of the transport carrier, a large frame on low wooden wheels. The mechanism by which the back wheels are set in motion by a driving arrangement, with or without chains, is attached beneath the frame, and in some models the motor also. More often, however, the latter, together with the generator, and a reserve of fuel, water, etc., is contained in a receptacle attached to the fore part of the car.

The French type looks rather clumsy and top heavy. It is like an omnibus.

The arrangement of the machinery is much the same.

In order to arrive at an opinion on the military utility of these automobiles, they must be tested as a means of transport and as motors.

In the former respect the small diameter of the wheels and the great weight upon the wheels (over 250 kilogr. per centimetre of the surface of the fellyes ; whereas in traction engines it is less than 150) ; moreover, the attachment of the motor under the flooring of the car make this type of vehicle appear ill-adapted for use in the field. A difficult bit of road or a ford, or a cutting, are enough to endanger the mechanism.

Regarded as a motor, the result is no better. Apart from electric motors, the use of which in the field in their present stage is quite out of the question, there are petroleum or essence motors, very fine sensitive mechanisms which will perhaps be usable in the future. At present the steam motor with liquid fuel is the best in Mirandoli's opinion in respect of economy, security, and simplicity.

A weak point about automobiles is undoubtedly the driving system. "Motor axles with 400 to 700 revolutions in a minute, pistons with a speed up to 3 metres a second on a track of 20 c.m., numerous cogs and chains form a very complicated mechanism, difficult to supervise, when one has it under one's eyes, how much more so when it is attached under the car and enclosed in a casing." Supervision is, however, all the more indispensable, that the unevennesses of the road considerably affect the regularity and symmetrical development of energy and the rhythm of the mechanical motions. In this symmetrical working of the machinery, however, lies the only guarantee that the individual parts of the organism will resist the strain brought to bear on them. Skill in the management, in order to guard against serious damages, and to avert slight ones, is at the same time of supreme importance.

"So far as one can judge, these conditions cannot be complied with with automobiles in their present state in a military column on roads, the section, and the maintenance in good condition of which is very variable, without workshops for repairs, even when the gradients are approximately normal."

The question would then arise whether automobile cars or traction engines will better fulfil the requirements for military transport in the field.

Mirandoli decides in favour of the traction engines, and founds his opinion as follows:—

"The automobile car of the future will be a steam car with liquid fuel, essence or petroleum; its available capacity will be 1,200 kilogr.; its total weight (laden) 3,000 kilogr.; its average speed 9·5 kilom. The average distance it will be able to do in the day may be put at 70 kilom."

Thus, while the automobile car resembles a horsed cart in capacity, it can do double the distance. The length of a column of automobiles is much the same as that of a similar number of four-horse carts, as the interval for automobile cars, on account of their speed, must be greater than that for carts.

Traction engines already give better results; progress in their construction and a ten years' experience exclude all doubt of their usefulness in war. With the compound system and the employment of petroleum as fuel the consumption has been reduced by half. Their average speed comes near that of automobile cars for heavy loads, the larger diameter of the wheels, and the width of the fellyes effect an easier motion, exclude the possibility of an upset, and at a slower rate of progress enable ascents to be more easily overcome. Besides this there is the greater strength and simplicity of the component parts. The consumption of water is more than with automobile cars, but this is no great matter, as 3 cubic metres suffice for a journey of 70 kilom.

A comparison between both systems according to Mirandoli is as follows:—

- (1) Ten automobile cars of 30 tons weight (Germ), 12t. available burden, go 9·5 kilom. an hour, or 70 km. a day. The length of the column amounts to 180 metres; 20 expert drivers are required; the cost mounts up to 60,000 francs.
- (2) A train of 2-wheeled trucks of 12 tons available capacity and 18t. total weight, drawn by an engine with 2-wheeled tender for water, fuel, and accessories—30 tons in all—requires only 4 men to work it, is 50 metres long and costs 30,000 francs.

Thus, everything is in favour of the use of the traction engine. While an automobile column of 10 cars seems on account of the independence of its individual parts more handy for use in the field than a train of trucks, still it must be borne in mind that in its case

there are 10 different parts exposed to the adverse influences of the roads, while with the united train there is only one machine.

In Mirandoli's opinion the present automobile car for heavy draught is not a machine for use in the field. If it is ever to be so, then the great progress which has recently been made in the construction of the generator of power must be applied in a more rational manner, excessive speed, and immense expenditure of oil must be given up, and the automobile changed into a perfected traction engine.

One need not take the utterances of the Italian Engineer Officer for gospel; but one cannot deny to the clear distinction which he makes the merit of having ably drawn attention to the difference between automobile 'sport' and the use of automobiles for transport in the field.

Automobile 'sport' could no doubt perform real services in the field on isolated occasions, and afford a valuable complement to proved means of communication. The far more important task which modern war, with its great masses of men, requires from the new invention consists in utilising it for conveyance of provisions, ammunition, medical stores, and the like, and this task cannot at present be considered as accomplished.

*From the Militär-Wochenblatt.*



## Prize Essay Gold Medallists.

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- 1872.....ROBERTS, Lieut.-Col. F. S., V.C., C.B., R.A.  
 1873.....COLQUHOUN, Capt. J. A. S., R.A.  
 1874.....COLQUHOUN, Capt. J. A. S., R.A.  
 1879.....ST. JOHN, Maj. O. B. C., R.E.  
 1880.....BARROW, Lieut. E. G., S.C.  
 1882.....MASON, Lieut. A. H., R.E.  
 1883.....COLLEN, Maj. E. H. H., S.C.  
 1884.....BARROW, Capt. E. G., S.C.  
 1887.....YATE, Lieut. A. C., S.C.  
 1888.....MAUDE, Capt. F. N., R.E.  
               YOUNG, Maj. G. F., S.C. (specially awarded a silver medal).  
 1889.....DUFF, Capt. B., S.C.  
 1890.....MAGUIRE, Capt. C. M., S.C.  
 1891.....CARDEW, Lieut. F. G., S.C.  
 1893.....BULLOCK, Maj. G. M., Devon. Regt.  
 1894.....CARTER, Capt. F. C., Northumberland Fusiliers.  
 1895.....NEVILLE, Lieut.-Col. J. P. C., S.C.  
 1896.....BINGLEY, Capt. A. H., S.C.  
 1897.....NAPIER, Capt. G. S. F., 2nd Bn. Oxfordshire Light Infantry.  
 1898.....MULLALY, Maj. H., R.E.  
               CLAY, Capt. C. H., S.C. (specially awarded a silver medal).  
 1899.....NEVILLE, Col. J. P. C., S.C.  
 1900.....THULLIER, Capt. H. F., R.E.  
               LUBBOCK, Capt. G., R.E. (specially awarded a silver medal).
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## MacGregor Memorial Silver Medallists.

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- 1889.....BELL, Col. M. S., V.C., R.E. (specially awarded a gold medal).  
 1890.....YOUNGHUSBAND, Capt. F. E., K. Dn. Gds.  
 1891.....SAWYER, Maj. H. A., S.C.  
               RAMZAN KHAN, Havildar, 3rd Sikhs.  
 1892.....VAUGHAN, Capt. H. B., S.C.  
               JAGGAT SINGH, Havildar, 19th P. I.  
 1893.....BOWER, Capt. H., S.C. (specially awarded a gold medal).  
               FAZALDAD KHAN, Dafadar, 17th B. C.  
 1894.....O'SULLIVAN, Maj. G. H. W., R.E.  
               MULL SINGH, Sowar, 6th B. C.  
 1895.....DAVIES, Capt. H. R., Oxf. L. I.  
               GUNGA DYAL SINGH, Havildar, 2nd B. I.  
 1896.....COCKERILL, Lieut. G. K., 28th P. I.  
               GHULAM NABI, Private, Q. O. Corps of Guides.  
 1897.....SWAYNE, Capt. E. J. E., 16th B. I.  
               SHAHZAD MIR, Dafadar, 11th B. L.  
 1898.....WALKER, Capt. H. B., D. of Corn. L. I.  
               ADAM KHAN, Havildar, Guides Infantry.  
 1899.....DOUGLAS, Capt. J. A., 2nd B. L.  
               MIHR DIN, Naik, Bengal S. and M.  
 1900.....WINGATE, Capt. A. W. S., 14th B. L.  
               GURDIT SINGH, Havildar, 45th B. I.

# UNITED SERVICE INSTITUTION OF INDIA.

October 1900.

CONTENTS OF SOME MILITARY JOURNALS RECEIVED  
BY THE INSTITUTION. THEY ARE AVAILABLE TO  
MEMBERS ONE MONTH AFTER RECEIPT IN INDIA.

*Journal of the Royal United Service Institution, June 1900:—*The new DeBange and piffard Rapid-fire Gun. Lessons of the War:—Personal observations and impressions of the forces and military establishments now in South Africa. An Italian view of the Boer War, Translated. Firing on coast defences, Translated. *July:—*The New German First-Class Battle-Ship 'Kaiser Wilhelm II,' 11,000 tons, 13 000 I. H. P. (Naval prize essay, honourably mentioned). Considering the changes made in naval construction during the past 20 years, and in view of the experience gained during the Chino-Japanese and Spanish-American wars, what are the best Types of War-Vessels for the British Navy, including armour, armament, and general equipment for ships of all types. War Maps. An Italian view of the Boer War. The intendantur system of the German Army. *August:—*The Creusot 3-inch Rapid-Fire Gun. Naval prize essay (subject as above). Shield protection for troops in the field. An Italian view of the Boer War. Collective practices.

*The United Service Magazine, July 1900:—*Notes on the evolution of Cavalry. The French Army of to-day. The employment of Artillery in South Africa. To what extent should the Bearer Company render assistance in the fighting line during the progress of an engagement (The Burroughs Wellcome prize essay, 1899). The staff of the British Army. Marines and Coaling stations. Reorganisation of the Corps of Royal Engineers. Our Army—Part I. Espartero. A soldier's pocket-book of the 17th century. *August:—*Notes on the evolution of Cavalry. Compulsory Military Service in England. The education of Naval Officers. The organisation of Howitzers with Field and Mountain Artillery. The War—the commencement of hostilities. Our Army—Part II. Mounted troops. Random notes from ancient history. Borodino (from the Russian of Lermontoff). The Conspiracy of Catiline. The forces arrayed against us in North China.

*Proceedings of the Royal Artillery Institution, April 1900:—*A heavy battery at the relief of Ladysmith. A recent survey in western

China. The Boer War, 1899-1900. *May and June* :—Excavating in Egypt. The Royal Military repository. Ground Scouts. The Boer War, 1899-1900. *July and August* :—Now that Q. F. guns and smokeless powder have been introduced, should any change be made in the tactics and the positions taken up by Field Artillery, Gold Medal Essay. In charge of a convoy in South Africa. The rocket troop. The Boer War, 1899-1900.

*Journal of the Military Service Institution, July 1900* :—Ideal ration for army in tropics. War lessons for laymen. Reorganization for Central Staff. Puerto-Rico. In re National Guard Essays. *September* :—Care of the soldier's feet. Cavalry drill regulations. Smoky powder. The National Guard. Journal of the United States Artillery. *July and August* :—The Maxim Nordenfolt mountain guns in the Philippines. The Second Boer War. The modern Infantry attack and the artillery of the defence. The 5-inch B. L. Howitzer. The collimating clinometer of Colonel Goulier.

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## United Service Institution of India.

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### THE NAVY AND THE MARINE BOILER CONTROVERSY.

LECTURE BY P. DONALDSON, ESQ., 23RD AUGUST 1900.

THE HON'BLE MAJOR-GENERAL SIR E. COLLEN, K.C.I.E., C.B.,  
IN THE CHAIR.

I feel that some explanation is necessary for devoting the paper I have been invited to read before your Institute, to so technical a subject as that of marine boilers.

In Simla we are remote from ships and all that concerns them. At the same time, however, we can none of us, whether we be soldiers or civilians, shut our eyes to the great controversy now going on at home as regards the propelling machinery of the fighting vessels of the Empire. What the horse is to the cavalry, that the boiler is to the battleship.

Only the other day, the home telegrams were announcing the fact that a committee, composed of Marine Engineers, was being appointed to enquire into the question of the Belleville boiler. What does this mean? It means that we are just now in the midst of changes in boilers signifying as great an innovation as occurred in our ships when iron, and eventually steel armour plating, took the place of the wooden walls of old England.

Within the past ten years a revolution has been effected, with the happiest results, in the boilers of the British Gunboats and Destroyers. The vessels of this class, now helping to guard our coast ports both at home and abroad, are amongst those which have been fitted up on the new method. Some of these, if not the majority of them, are capable, I believe, and I speak as an engineer, of approaching if not of emulating, the wonderful record of one of their class—the First class gunboat *Speedy*, which, after going through the whole of a long series of exhaustive trials at home, came back after a three years' commission to the dockyard for the usual overhaul, and was found to have been so little affected by what she had gone through, that, in the words of my informant, she was ready to be turned round and go out again on a second three years' commission. I need hardly say

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that such a thing was practically unknown before the *Speedy's* time, and is still practically unknown in the case of men-of-war, fitted with the older type of boilers. H. M. S. *Speedy* was built and engined by Messrs. Thornycroft & Co. in 1893, and furnished with Mr. Thornycroft's patent water-tube boilers. The success of this vessel was such that the Admiralty determined from that time to adopt the water-tube type of boiler as the steam generator for all war-ships. Experts are now not only challenging this decision, as regards the larger classes of war-ships, but say that the particular design of water-tube boiler which was adopted for use in them, *i.e.*, the Belleville, has not proved the success it was confidently hoped it would be. For instance, it is fortunate that there is no urgent demand in Indian waters for the services of Her Majesty's cruiser "Highflyer," which has for so long been unable to come out owing, the papers inform us, to repairs found necessary when she got as far as Gibraltar. The fact, however, of this fine new vessel requiring so much alteration on her voyage shows how serious the matter has become. It wants no great imagination to conceive circumstances under which the enforced detention of the flag-ship of the Indian station in port, for repairs to her Belleville boilers, might be exceedingly grave.

Perhaps, I should intimate that I am a partizan of the Thornycroft boiler. Although holding no brief from Messrs. Thornycroft & Co., I have followed with great interest, perhaps with no little enthusiasm, the progress of the firm in which my late brother was a life-long partner with Mr. J. I. Thornycroft. Having, therefore, had exceptional opportunities of studying this subject, I am strongly of opinion that the Thornycroft boiler is the best boiler afloat for all classes of war-ships.

The importance of the question to England's Navy, if she is to maintain her unrivalled position, is my reason for selecting the subject which has been announced for my lecture to-day.

The boilers of a steam-ship, although forming only a part of its mechanism, are essentially of the first importance in its propelling agency. And controversy amongst those who "go down to the sea in ships" has been rife for some time back and is still running high on the platforms of the Scientific Institutes, in the technical journals and press generally, even penetrating into the arena of politics, as to what sort of boiler, whether fire-tube or water-tube, is most suitable for the larger classes of war-ships. All else being the best of its kind, there is a consensus of expert opinion that on the boilers of a battle-ship depends her efficiency as an engine of naval warfare.

My aim, therefore, in this paper is to lay before the members, without going into unnecessarily technical detail, a clear and simple exposition of the difference between the two kinds of boilers over which the controversy is raging, my own conclusions on the subject, with some reasons I have for the faith that is in me.

In attempting to explain these differences it will be interesting to describe, as briefly as possible, the sort of marine boiler which is still accepted in the mercantile marine as the best for both the liner and the cargo boat, in fact the particular type which many skilled experts declare is also best for the larger classes of war-ship, and

which is still to be found on board certainly the majority of the steam vessels of our navy. It belongs to the fire-tube type. It is commonly called the Scotch boiler, sometimes the cylindrical, and by many the shell or tank boiler. By whatever name it is called, it is a boiler that represents the accumulated experience of many scientific, as well as practical minds. For all round steady work and economy it is of an excellence difficult to surpass.

In describing this cylindrical boiler, as I prefer to call it, allow me to refresh the minds of my hearers with just a very little elementary thermo-dynamics. When water is boiled in a kettle, its temperature, and that of the steam rising from it, remains at or near  $212^{\circ}$  Fahr. and the pressure of the steam is no more than sufficient to make its way into the atmosphere, being the same as that exerted by the atmosphere itself, namely, 14.7 lbs. per square inch. If the lid and spout of the kettle are closed up and it is provided with two apertures, one into which water can be forced, and the other from which steam can be drawn, the temperature and pressure to which steam can be raised within it and utilised, are only limited by the strength of the cylinder to withstand bursting. A cylindrical boiler is, therefore, simply a highly magnified and glorified kettle! In the days of Watt, it was called the wagon boiler, because it was at the time shaped like the body of a country wain and had a furnace underneath between where the wheels would be. Gradually, in order to bring the products of combustion into more intimate connection with the mass of water within, the furnace was placed in a fire-tube fixed into its capacious interior. Since then, and without deviating from the above principle, it has been designed of all conceivable shapes and sizes to conform to the uses to which it has been put whether for land or aboardship. But although this principle of design has been cherished, powerful factors have been at work of late years to improve the cylindrical boiler. In shape, for instance, the cylindrical form has been adopted wherever practicable, as best suited to withstand the higher pressures of steam to which it is now subjected; ductile steel, capable of withstanding high strains and stresses, has been introduced into its manufacture; a superior class of tools is now employed whereby accuracy of workmanship is secured; and when at work, only pure fresh water is boiled in it.

The diagrams\* shown in figure No. 1 represent a front elevation and sectional side elevation of this type of boiler as designed for marine purposes. In this boiler, there are sometimes as many as four fire-tubes or furnaces (P) terminating in two or three combustion chambers (Q). These chambers perform a two-fold duty. They thoroughly mix up the gases and so facilitate their ignition, besides acting as holders for the smaller fire-tubes (R) which are fixed into them, and through which the products of combustion have to pass on their way to the chimney. It will be observed that the course of the gases is through these tubes and not outside them. In the forties and earlier, when the working pressures were low, the outside shells of marine boilers used to be made of a shape to conform more or less to the space they had to

\* These diagrams were copied from the Minutes of the Proceedings of the Institution of Civil Engineers, Volume CXXXVII, Session 1898-99, Part III, being illustrations to paper by J. T. Milton, Esq.

occupy in the boiler room. They were huge metallic box-shaped structures in fact, with flat sides and bottoms as well as flat ends, and were only stayed in proportion to the pressure of steam they had to withstand. In those days the danger from pressure was as great from without as from within, and valves, opening inwards used to be fixed to the steam space, so that all danger of collapse might be avoided through the pressure of the atmosphere on the shell acting on the vacuum formed when the water was blown out at the end of a voyage. The air rushing through these valves restored the equilibrium. Gradually, in response to the demands for higher pressures, so as to economise steam whilst increasing the speed of the vessel, the more or less square sides assumed, first the oval, and finally the cylindrical shape, steel for the shell being substituted for iron. The fire-tubes also became cylindrical and were further increased both in surface and in strength, by corrugating them. But the flat ends both back and front, strongly fortified with stays, still retain their drum-head form, flat vertical surfaces being necessary on which to affix the battery of horizontal fire-tubes, and convenient for the uptake casings and other fittings and mountings. The cylindrical boiler of the present day, therefore, has a cylindrical shell and flat ends composed of strong steel plating suitably rivetted together, forming the "kettle," but the fire-tubes in which the furnaces are fixed—all the heating surfaces in fact—lie within its capacious area.

This then is briefly the form of the steam boiler now in use in the majority of the steamships of the present day, both in the Mercantile Marine and in the Navy. Its weak points are deficient and sluggish circulation and great weight and rigidity: its strong points strength, and economy in coal consumption. But I must qualify this statement. These weaknesses are only apparent when the cylindrical boiler is called upon to perform a task which to this particular steam generator is an almost impossible one, only attempted in naval manoeuvres.

In describing what this task is, I cannot do better than quote Rudyard Kipling's impressions on the varying strains to which a Queen's ship is subjected when the fleet is "in Being." He wrote:—

"One thing more than all the rest impresses a passenger on a Queen's ship. She is seldom for three whole hours at the same speed. The liner, clear of her dock, strikes her pace and holds it to her journey's end, but the man-of-war must always have two or three knots up her sleeve in case the admiral demands a spurt; she must also be ready to drop three or four knots at the wave of a flag; and on occasion she must lie still and meditate. This means a varying strain on all the mechanism, and constant strain on the people who control it.

I counted seven speeds in one watch ranging from eight knots to seventeen, which, with eleven, was our point of maximum vibration. At eight knots you heard the vicious little twinscrews jiggeting away like restless horses; at seventeen they pegged away into the sea like a pair of short gaited trotting ponies on a hard road. But one felt, even in dreams, that she was being held back. Those who talk of a liner's freedom from breakdown should take a seven thousand horse power boat and hit her and hold her for a fortnight all across the salt seas."

As an engineer, who has had numerous opportunities of being on board both Gun-boats and Destroyers of the latest form and design

whilst they were undergoing their trials at sea, let me assure you of the absolute, unexaggerated truth of this description.

One reason why the cylindrical boiler has failed in the war-ship then is because the continual strains of modern manœuvres upset this rigidly framed structure and start it to leak. If you will follow me on the diagram shown in figure No. 1, I will explain what happens. These two flat vertical plates which are shown in the section and to which the rows of tubes are fixed are called the tube plates. They are subjected to an enormous pressure, in fact to that of the steam within, say from 150 to 200 lbs. per square inch of their surface. To withstand this pressure they are stayed to absolute rigidity with tube stays secured at intervals over their surface, and the intermediate tubes are fastened into each plate by expanding their ends. These tubes serve as stays in some measure. But should either of these rigid flat surfaces be disturbed by sudden and unequal strains thrown on them—as for instance by forcing the fires at one moment, and damping them at another,—the metallic contact which should exist between the ends of the tubes and the tube plate, especially at the combustion chamber end, is similarly disturbed. In addition to this, the fierce heat of the gases attacks and burns the ends of the tubes where they are expanded into the plate. The pressure from within, acting on these weak places, causes the tube ends to leak. From that moment the cylindrical boiler is more or less *hors de combat*. With an installation of from ten to twelve such boilers on board a battle-ship all made alike, all subjected to similar strains and leaking under them, the situation in a sea way or an action would be a grave one. In fact, it would mean drawing the fires, reducing the pressure and stopping the engines. An accident to H. M. S. *Barracouta* in 1890, when flames were driven into the stokehold (causing the death of two men) by an unusual increase of the leakage of her tubes, seems to have convinced the Admiralty that something must be done. The result was that the "Admiralty Ferrule" was tried, a device intended to keep those parts of the tubes which are expanded in the tube plates from direct contact with the hot gases, and has since considerably mitigated the evil. This, however, is of the nature of a temporary expedient only, and the adoption of the water-tube type of boilers has since achieved the same result in a more satisfactory and permanent way.

One grave fault of the cylindrical boiler is, that it has no systematic cycle of circulation to minimize its acknowledged constructive defects. If one could look into a boiler of this description when the furnaces are ablaze and watch the operation going on, it would be seen that wherever the heat was greatest, there the ebullition due to the conversion of the water into steam, would be most pronounced; whilst on the more remote surfaces, not exposed to the direct action of the heat, it would be practically nil. Now efficient circulation in a boiler depends in a measure on how it can be directed, as well as on where the heat is applied. The descending and ascending currents must be guided if the best effect is sought to be attained. This effect is certainly the production of the greatest quantity of steam in a

given time from the volume of water within the shell. In an ordinary kettle, full of water, the heat is applied to the outside from below, whilst in the cylindrical boiler it is applied higher up in the mass of water. So it is possible with its large heating surface near the water line and the total absence of means for guiding the currents to apply that heat with such force as to generate and accumulate steam in the steam space from the surface water, whilst below the furnaces, the water may be almost cold. I need hardly point out how strong this type of boiler would need to be to withstand the heavy strains and stresses due to unequal expansion which this "forcing" sets up. And yet in naval tactics it is often necessary to resort to such "forcing." Is it then any wonder that the cylindrical boiler has broken down under the strain?

The boiler therefore, which is destined to supersede this fire-tube type in the Navy, must not only be capable of at once yielding copious steam for that 20-knot spurt which the admirals demand of their fleets on occasion, or of transforming, "at the wave of a flag," this extra energy into the every day 10-knot calm of the cruise; but it must also be able to raise steam from cold water in the shortest possible time,—certainly within half an hour,—without being strained or injured in any way.

It is to the inventors of the modern water-tube boiler that praise is due for designing a steam generator capable of performing these apparently diametrically opposite feats without apparent effort or risk.\*

If we except Savery, to Perkins is probably due the first practical exposition in England of the value of the use of steam at high pressures as applied to the steam engine. He designed a water-tube boiler to work at a pressure of 350 lbs. per square inch and an engine to utilize this pressure economically. In this engine he showed how the steam could be passed from one cylinder to another until its efficiency was spent, and thus paved the way for the three and four cylinder compound surface condensing engines of the present day. Mr. Loftus Perkins was also one of the first, if not the first, to put into practical shape mechanism for the prevention of the introduction of impurities into a marine boiler, and using in it only pure soft and fresh water.

\* In this connection the following extract from an official report of the trials of a cruiser fitted with Thornycroft boilers is of interest:—

"During the trials the boilers worked most excellently. Steam was kept with the greatest ease; the steam generating power could be regulated nearly immediately to suit the steam consumption of the engines by means of the stop-valves on the steam pipes of the fans. At the end of the sea speed trial, for instance, we forced the engines up to 3,314 indicated horse-power in a few moments, after having steamed over seven and a half hours with an air pressure of about 0.6 inch and could keep the steam, at this high horse-power, with an air pressure of about 1 inch.

"When going full speed we often stopped the ship immediately, and we could bring the ship up to full speed in a few minutes, it being unnecessary to take any regard whatever to the boilers, these being able to stand all sudden changes of temperature.

"The boilers never primed, neither during the highest forcing nor during sudden changes in the working of the engines."

(The boilers referred to were designed for a maximum power of 3,000 indicated horse-power.)

The necessity of only using fresh water and barring impurities of all kinds from a marine boiler is now so recognised that I venture to say there is hardly a single steamship propelled through the salt seas, in the boilers of which, be they fire or water-tube, pure soft fresh water is not used. It may be said, indeed, that pure fresh water is as necessary to the life of a marine boiler now-a-days as it is to the health of human beings. Speaking in 1877 at the Royal United Service Institution of the Perkins' system, Mr. John Frederick Spencer, another of England's clever inventors, was of opinion that "it was only a question of time—though whether in Mr. Perkins' exact form he could not say—for this system of boilers and engines to be adopted in general practice." And this prediction has been in some measure fulfilled. The use of pure fresh water in marine boilers combined with high pressures of steam, and its more thorough utilization in an engine, designed to use it up with economy, is now the rule and not the exception. But Mr. Perkins, although on the right road to success as regards high pressure and how to apply it economically, was wrong in the principle on which he constructed his water-tube boiler. This Perkins' boiler was not constructed to circulate the water within it, but to make steam by "foaming." As he himself explained "the water does not circulate as it does in a hot water circulating apparatus: the water foams and the whole of that boiler is partially full of steam and partially full of water." Herein Mr. Perkins failed. And similarly, owing to imperfect circulation, Howard and Rowan, who some years afterwards attempted to introduce the water-tube boiler for marine purposes, also failed. The disastrous results, which followed this inability to comprehend the consequences of faulty circulation, effectually put an end to British enterprise in this direction for some years until Mr. Thornycroft took the matter up. He was one of the first, if not the first, to recognise that perfect circulation is as necessary in a boiler as it is in a human being.

Broadly speaking, the functions of a steam boiler are (1) to make steam; (2) to make as much as possible with a minimum expenditure of fuel; and (3) to do this with the least possible risk of accident. Economy in the production of steam depends on the heating surfaces of the boiler being clean, on there being a sufficient area of these surfaces, on the hot gas being distributed uniformly over them, on perfect combustion of the fuel, and perfect circulation of the water confined within. By circulation is meant a methodical and rapid movement of the whole of the confined water over the heating surfaces in such a way as to carry all steam bubbles, as they are generated, as quickly as possible to the steam space of the boiler, supplanting them as quickly by a continuous flow of solid water over all parts of the heating surfaces. Obviously, the power of a boiler to make a large quantity of steam depends on the method and rapidity of this movement of the water, as well as on the other conditions I have just enumerated. But in addition to these there must be freedom from "priming." "Priming" is a technical expression used by Engineers to denote that condition within a steam boiler when the water is carried over along with, and by, the steam on its passage to the engine cylinders. Water in the cylinders, I would add, is fatal to the good working of a steam engine. A familiar instance of "priming" is the boiling over of the contents of a coffee pot on the domestic hearth.

Freedom from priming in a marine boiler is ordinarily secured by the use of pure fresh water. But it is also essential that the water surface from which the steam escapes should be commodious enough to allow the escape to take place at a low velocity,\* so that the water surface is disturbed as little as possible. Immunity from accident is to be obtained by ensuring (1) that the materials and workmanship of the boiler are good and that the strength of the structure is ample; (2) that they remain good, *e.g.*, that the design is such as to prevent any portion of the heating surface being more than momentarily dry,—a condition requiring rapid and systematic circulation so as to avoid unduly heating the metal or burning it.

It will be seen from the foregoing that the chief essential in a good boiler (one which will give the maximum quantity of dry steam per square foot of heating surface and per lb of fuel with a minimum of wear and tear or risk of accident) is *efficient circulation, i.e.*, a continuous movement of the water over the heating surface, constant in direction, and at as high a speed as can be obtained by the judicious application of the force of gravity. The motion should be constant in direction over any given part of the heating surface, otherwise, during the pauses between the changes of direction, a steam bubble may increase in size and keep a portion of the heating surface dry long enough for the metal to be injured by the white heat of the furnace. This would be from 2,800° to 3,000° Fahr. under forced draught. The motion should be rapid; both to reduce the possible period during which a given spot is kept by a steam bubble from contact with water, and also because experiments have shown that a distinct gain in the efficiency of heat transmission results from an increase in the velocity of the current of water passing over the heating surface. An incidental advantage of a high speed of circulation is that it tends to keep the heating surface clean by preventing the deposition of suspended matter while the boiler is at work.

Figures 2 to 11 of the diagrams † are examples of the more successful of modern water-tube boilers. If these figures are studied, it will be observed that there is a great similarity in the general design of all these steam generators. It is only when the manner adopted in arranging the tubes, and in directing the current of water within them is studied, that divergences, some of them of vital importance, are discerned. The broad features of the general design are stacks of tubes arranged in various ways in rows over a furnace so as to form a crown to it. In some, as for instance, in those depicted in figures 7, 8, 9, 10 and 11, the lower ends of the tubes are secured in two or more horizontal cylinders (A) common to them which lie at or below the furnace level and in all cases beyond its influence.

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\* The effect of the velocity with which the steam leaves the surface of water, on the priming of tank boilers, is gone into in some detail by Sir W. Anderson in his lecture on the "generation of steam," read in December 1883, before the Institution of Civil Engineers.

He tabulated 10 boilers on page 49, and found that in a Marine Boiler there was a tendency to prime when the velocity was 0.127 foot, and that a stationary locomotive boiler could with difficulty be worked with a velocity of 0.16 foot per second.

† These diagrams were copied from the Minutes or the Proceedings of the Institution of Civil Engineers, Volume CXXXVII, Session 1898-99, Part III, being illustrations to a paper by I. T. Milton, Esq.

These cylinders are called feed collectors. The upper ends of the tubes are in all the designs secured in a horizontal cylinder of roomy dimensions (B) which extends, in some types, high above the stacks of tubes and over the furnace as shown in figures 7, 8, 9, 10 and 11 and as in figures 2, 3 and 6 beyond its influence altogether. This upper cylinder is called the separator or steam chest. Connecting the lower to the upper cylinder are large external vertical tubes called down-comers (C) more conspicuously noticeable in figures 8, 10 and 11 by which the water is conveyed to the feed collectors from which the rows of tubes are fed. The whole arrangement of tubes is enclosed in a heat resisting case (D). Within this case also are arranged the furnaces (E). They are so placed that the hot gases pass up through and about the stacks of tubes, and, debarred from passing beyond the case, finally find their way, robbed more or less of their heat units, to the chimney. There are departures in the boilers illustrated in figures 4, 5 and 6 from this general design I have just described, more especially as regards the attachments of the tubes. Whereas in the other cases the attachments are made direct to the feed collectors and steam chests, in figure 4 the Lagrafel D'Allest boiler of the French Navy, a down-comer (F) common to all the tubes, supplies them with water, and a header (G) also common to all the tubes conveys the generated steam to the steam chest above. In figure 5, the Babcock and Wilcox, there is a similar arrangement but with this difference that each vertical row of the stack of tubes has its own down-comer and header. Niclausse again—*vide* figure 6—employs Field tubes wherein the lower ends are closed, and the current within them guided downwards by an internal tube open at both ends, whilst the ascending current occupies the annular space. In this system the internal tubes are attached to the diaphragm dividing the down-comer H and header J. Each tube therefore has its own cycle of circulation, and the system is one said to stand hard forcing. But it has its drawbacks. It is difficult to empty the water from the tubes when the boiler is not at work—a difficulty which must be inimical to the life of the tubes from the oxidation thus set up.

If water is now pumped into this type of boiler until the level appears in the upper cylinder or steam chest, and the furnace lighted, the water ascends within the tubes and thus a circulating action is set up. This movement, at first slow and feeble, owing to the slight difference in the density of the mass, is accelerated as the water expands in the rising temperature, and gradually increases in velocity as the boiling point is reached. When all particles of water within the tubes have reached this temperature, those particles in actual contact with the surfaces exposed to the action of the fire are now converted into steam, increasing greatly the volume of the contents of the tubes, and consequently the velocity of the circulation within them. In a well designed steam generator of this type, therefore, the more it is forced the greater is the velocity of the circulation, and so long as the direction of this current is not checked, and the feed water pure and fresh, there is really no practical limit to the amount of forcing it will stand with impunity.

It is from this type of steam generator that the Belleville boiler, see figure 2, has been selected by the Admiralty as embodying



all the qualities they consider desirable and necessary for the larger classes of warships. They have fitted and are continuing to fit this design on board the latest battleships and first and second class cruisers, but from all that can be learned, these boilers have not given unqualified satisfaction. There is great difference of opinion between experts as to how far the Admiralty have been justified in pinning their faith to this design to the exclusion of all others for the classes of vessels mentioned.

The general arrangement of the latest design of the Belleville water-tube boiler is shown in figure 2. The diagram on the right is a front view half in elevation and half in section, and that on the left a sectional side elevation showing the furnace and stacks of tubes. There are two stacks of straight tubes, the lower (K) for generating the steam and the upper (L) for heating the feed water. The products of combustion from the furnace pass between and about the tubes, collect in the combustion chamber (M) between the two stacks, and from thence pass between and about the upper tubes on their way to the funnels. The lower stack consists of sets of straight tubes placed side by side, each set joined together, so that the top end of one tube and the bottom of the next occupy a common socket, (N) called a junction box. Thus joined each set becomes an element, as it is called, and springs at the bottom end from the feed collector (A) common to the whole row. The tubes of an element are straight, and zigzag at a slight inclination from the horizontal from front to back of the furnace, and, as the junction boxes lie vertically one over the other both at front and back, each element forms a flattened spiral terminating at the top in junction with the steam chest, which, like the feed collector below, is common to all the elements. The peculiar feature of the junction boxes is that they lie loose one over the other, so that the tubes can expand and contract without let or hindrance in the direction of their length. Being closely packed side-ways, there is little or no lateral movement. The upper stack of tubes is similarly formed and arranged. The furnace with its batteries of elements is suitably enclosed within an iron casing on all sides lined with fire-brick where the heat would affect it.

If the closed ends of the steam chest are now connected by "down-comers," with the closed ends of the feed collector below, we have in this combination the essential features of the Belleville boiler. The feed water is first pumped from the top downward through the elements forming the upper stack, and, properly heated, is then delivered into the steam chest to keep the water level good when the boiler is at work. The solid water finds its way by the down-comers by gravity into the horizontal feed collector below, from thence to the tube elements where the steam is generated, and zigzags its way within them, finally delivering into the steam chest above in a stream of water and steam. There the steam is separated and the solid water again descends to find its way back through the elements in the shape of steam and water.

The Belleville boiler thus depends for its circulation on the difference between the density of the solid water in the descending column and that of the mixture of water and steam in the ascending spirals or elements. These, from their peculiar design of acute angles and great length, some 50 feet, must necessarily present considerable

obstruction to the upper progress of the current within them. This obstruction is further accentuated when it reaches the steam chest, where it has to force its way above the water-line against the weight of water lying over the submerged mouths of the elements. It is said that the density of the descending column overcomes all these obstacles and keeps the circulation good. It seems to me that it must depend on the velocity of this current through the ascending spirals as to whether this contention has been satisfactorily established. If the circulation is sluggish, it must need very little to disturb the balance between what may be called efficiency and danger. For instance, it is an axiom in boiler engineering that strong forced draught can only be applied with safety where there is rapid and perfect circulation, and we are told that forced draught has been abandoned in the British Navy in connection with this design of boiler. Why is this? Is it because any undue generation of steam in the lower tiers of tubes next the furnaces due to forcing, would tend with sluggish circulation to fill those higher in the spiral with steam and so cause them to burn? Another significant fact is that these boilers are placed preferably on boardship with their tubes running fore and aft. It was found that a permanent list on a vessel, having her boiler tubes athwartships, reversed the slope of the tubes, stopped the circulation, and caused the formation of the dreaded steam pocket. In other words caused the burning of the tubes.\*

One great structural defect in the Belleville boilers,—a defect in fact which is common to all the designs of water-tube boilers excepting the Thornycroft,—is the loss of heat by radiation, contact of air, and conduction, from the surfaces of the metallic casings forming the external walls or covering of the boiler. These casings are exposed from within to the high temperature due to the heat from the furnaces. The heat thus dissipated into the stokehold not only tends to increase the coal consumption, but, if all accounts are true, renders the temperature of the stokehold almost unbearable to the stokers.† Thornycroft has very cleverly avoided this in his boiler by placing the outer rows of the tubes next the external casing in contiguity, so that from these surfaces the loss of heat is that due only to the temperature of the water and steam within the tubes. Another advantage of this method of construction is that the efficiency is better maintained over a large range of rates of working. Professor Kennedy, after a series of careful tests of a Thornycroft boiler, reported:—"He considered that Mr. Thornycroft was to be congratulated very heartily on having produced a boiler which could not only attain such a large economy

\* Page 183, Volume XXXVIII, Transactions, Naval Architects.

† One of the novel features of Mr. Thornycroft's boilers was the use of "walls" formed of tubes bent in vertical planes, for forming the flues and sides of the boiler.

The importance of this as a means of reducing radiation by limiting the temperature of the boiler casing to that of the water, may be seen by comparing the losses of radiation in a "Thornycroft" boiler tested by Professor Kennedy with those shewn in a paper by Mr. Yarrow (*Engineering*, Volume LXV, page 411).

In the latter a loss of heat took place greater at low rates of steaming than that saved by a Feed Heater, the inside of the boiler casing being at a temperature of about 700° Fahr.

In the former the loss was quite small; being only 7 per cent. at the highest rate of forcing, and the temperature inside the casing about half that of the Yarrow. This meant a great deal more comfort for the Stokehold Staff.

over long and rigorous trials, but so large an economy over a very wide range of work—a thing which he thought had rarely been done or even attempted.\*

The bad effect of metallic casings in contact with the temperatures due to the heat of the furnaces is pointed out by Mr. Milton from observation.†

These defects seem to have been established if the accounts to be read in the press are true. That the boiler still falls short of the expectations first formed of it is clear, because since its introduction into the Navy it has been altered in various ways. The feed heater with the combustion chamber between the two stacks of tubes are additions said to conduce to economy of coal consumption, and the number of tubes which constitute an element have been reduced, possibly with a view to improve the circulation.

On the other hand, the Belleville boiler possesses several points in its favour which appeal to those who have to work it. If the tubes are liable to injury, they are easily replaced. All the parts are accessible and permit of easy examination and repair, by the substitution of duplicate parts for those injured or worn out. Its design also possesses the qualification of adaptability. It can be added to or subtracted from both as a complete unit capable of furnishing a given power, as well as in the number of the component elements which go to make up that unit. Hence in arranging the disposition of the boiler power in the boiler room of a battleship, the units can be made up to suit and packed away in the available space as easily as ammunition in a wagon! It also possesses that virtue common to all water-tube boilers, of being made up of small component parts, so that there is no disturbance of decks when fitting it in position or removing it from the ship as there is with the cylindrical boiler.

For the smaller craft from 3rd class cruisers downwards, they have perforce had to adopt the other designs of the same broad type I have described and illustrated in figures 7, 8, 9, 10 and 11 because, although the Belleville boiler is lighter by one-third than its cylindrical rival, it is nevertheless much heavier, power for power, than the majority of the other water-tube designs; and in the smaller craft weight and space occupied are all important factors. For instance, the weight of a cylindrical boiler of the Navy type averages about 150 lbs. per indicated horse power, as against 102 lbs., the weight per I. H. P. of the Belleville boiler. But the "Thornycroft" and similar "Express" boilers as supplied to cruisers weigh only 75 lbs., whilst those supplied to Destroyers weigh an average of only 25 lbs. per I. H. P.

Hence the Admiralty have afloat quite a number of other designs of water-tube boilers, having small tubes as illustrated in figures 7, 8, 9, 10 and 11, to which has been given this rather neat title of "express" boiler, to signify, I suppose, power and rapid steam raising qualities, combined with lightness. They all conform to the general description I have already given as common to this type of steam generator, but depart from it in details, a departure sometimes of the first importance.

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\* Proceedings, Institution of Civil Engineers, Volume XCIX, pages 61 and 74.

† *Vide Engineering*, Volume LXV, page 428, third column.

Whilst retaining the horizontal steam chest and feed collectors to which the stacks of tubes are secured, as also a certain limit as regards diameter of the water-tubes, there is for instance only one maker, Yarrow, *vide* Fig. 7, who employs straight tubes and ignores the down-comer. The circulation he says is down those situated furthest from the fire and up those nearest. All the other designs of express boilers have bent tubes of small diameter.

The several varieties of the small bent tube design shown in the diagrams are, in my opinion, simply flattering imitations of the "Thornycroft". They have the tubes arched over the fire so as to form a continuous roof or crown to the furnace, curving back again before entering the steam chest above. Of these the one which seems to have stood the fiercest tests, both as regards endurance and efficiency, is certainly the "Thornycroft," *vide* Figs. 8 and 9 showing two designs of this patent. By an ingenious arrangement, the contiguous lines of tubes which form the firebox having been curved to form the arch alter the direction of their curvature turning apart again to give room for the steam chest. By this formation of contiguous lines they prevent the hot gases from passing beyond them to the steam chest, thus affording great protection to this vessel. Similarly two rows of outside tubes unite to form an internal casing to the boiler—an arrangement which, as I have explained, secures a cool boiler room and comfort to the stoker. Between these two barriers numerous other tubes are placed. Mr. Thornycroft's designs are singular in this respect that the tubes are secured into the steam chest above the water line of this vessel. In almost all, if not quite all, the other designs, the tubes are secured into the steam chest below this water line. It is, therefore, perhaps the one water-tube boiler which has been arranged to deliver its ascending current at and above the water line. Mr. Thornycroft's contention is that the velocity of the circulating current is retarded in the case of these "drowned" tube boilers by the weight and friction of the head of water under which the tubes have to deliver into the steam space. I have already demonstrated how essential it is for the life of a water-tube boiler, and its efficiency as a steam generator, that a high velocity and constant direction of current should be maintained. These are no mere theories, but the result of actual recorded experiment.

In 1894 Mr. Thornycroft experimented with two boilers made as nearly as possible alike, except that in one the tubes discharged above and in the other below the water line. The objects of the experiment were to determine the relative speed of the circulation in the two types, and to ascertain their behaviour with water which was known to produce priming in ordinary boilers. The result of the experiments\* showed (a) that the circulation of the Thornycroft boiler was rather more than double that in a drowned tube boiler of equal size, and (b) that water with which the Thornycroft type would just work without priming, had to be diluted with its own bulk of good fresh water before it could be used under similar conditions in a boiler fitted with drowned tubes.† To understand the reason of this

\* *Engineering*, Volume LVII, page 399.

† The Thornycroft boiler will work without priming with water just twice as bad as other water-tube boilers can use—*Vide* Proceedings, Institution of Civil Engineers, Volume CXIX, page 114. On emergency salt water can be used in them if proper precautions are taken—*Vide Engineering*, Volume LXIII, page 98.

superiority of the "Thornycroft" boilers as regards circulation and freedom from priming, it may be well to refer to the figures in diagram Nos. 8 and 9. It will be seen that the water-line in the cylinder (B) while well above the top of the down-comer tubes (C) is below the ends of the steam generating tubes.

Several advantages result from this arrangement:—

1. It is impossible for the down-comers to contain steam bubbles since the steam is not discharged into the water but into the steam space. In most other water-tube boilers a portion of the steam is dragged down with the descending water, and, by diminishing the mean density of the water in the down-comers, lessens the hydrostatic pressure available for producing circulation.\*
2. The ends of the tubes being above the water-line it is impossible for water to re-enter them and so cause the local stoppage or even reversal of current which has been observed to take place with drowned tubes.† This immunity from stoppage or reversals not only avoids a diminution or stoppage of circulation (much as a non-stopping express train is faster than a stopping one), but it also permits a more free escape of steam and is distinctly unfavourable to the formation of the dreaded "steam-pockets."

The mixture of water and steam contained in the Thornycroft generating tubes shoots towards the centre of the upper cylinder, and the peripheral area of these jets constitutes a very large water surface from which the steam freely escapes without first having to traverse any considerable thickness of water. To this peculiarity is doubtless due the fact, already referred to, that they are in practice so much less liable to prime than any other known type of boiler.‡

For naval purposes it is necessary, as I have shown, to be able, at a pinch, to force the boilers far beyond their normal rate of working. Experiments described in *Engineering* (Volume LVIII, page 214) illustrated by a diagram, showed that this could be done with a "Thornycroft" boiler, with far greater security than with a boiler of the drowned tube type.

The amount of forcing which the "Thornycroft" boilers stand without damage is astonishing. For instance, one of them in a vessel of the Danish Navy was forced until 111 lbs. of coal were burnt per square foot of grate surface per hour without injury; what this means will be understood better if I state that in ordinary working from 25 to 30 lbs. is considered a very high consumption.

I have pointed out, as an instance of deficient circulation in the cylindrical boiler, that steam may be generated from the water near the water-line whilst below the furnaces the water may be almost cold. If this rapidity in raising steam—another expression for forcing—were indulged in regularly, the unequal strains set up would ruin the cylindrical boiler in a very short time.

\* See Mr. Thornycroft's paper on "Circulation in Water-tube Boilers," *Engineering*, Volume LVIII, page 214. Also remarks by Messrs. Thornycroft and Wingfield in the discussion of Mr. Milton's paper on Water-tube Boilers. Min. Proc., I. C. E., Volume CXXXVII.

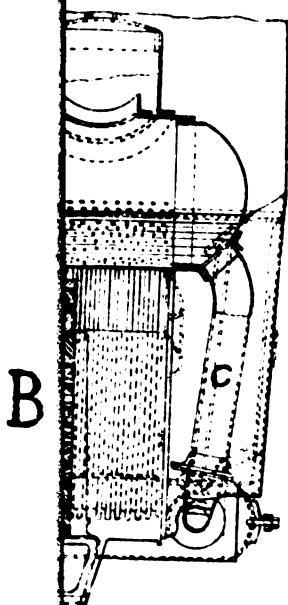
† See Mr. Thornycroft's paper on "Circulation in the Thornycroft Boiler," *Engineering*, Volume LVII, page 399.

‡ Min. Proc., I. C. E., Volume CXIX, page 114.

Fig. 3.



HORNYCROFT BOILER (DARING TYPE).











So much is this recognised in the merchant service that the fires are lit, if possible, as early as 24 hours before the time of sailing and gently maintained, so that the temperature of the structure and the water within it may be very gradually raised to the boiling point. Now in the Thornycroft boiler—indeed in all well designed water-tube boilers—the structure is so strong yet so elastic, has so much “give” in it, that no such precaution is necessary. Steam may be raised from cold water at express speed without setting up any undue straining or injury to the boiler in any way. An unprecedented trial was made with the “Daring,” a Thornycroft destroyer, one boat-race day at Chiswick, to show some friends the rate at which steam could be raised. The wood used was damp and the labourers employed knew nothing of stoking, yet in 14 minutes 20 seconds the pressure-gauge showed 100 lbs. steam pressure.

In an address read in November last at a general meeting of the society of Naval Architects and Marine Engineers in New York, by Mr. G. W. Melville, Engineer-in-Chief, United States Navy, he said :—

“The fact that water-tube boilers raise steam quickly is of the greatest advantage. I have stated elsewhere that I consider the battle of Santiago to have developed the necessity of use of the water-tube boilers, whether it taught us anything else or not. It would have been of the greatest advantage to have had, during the blockade of Santiago, boilers capable of raising steam in less than half an hour.”\*

It is beyond the scope of this paper to attempt to discuss the relative advantages or disadvantages of the various designs of water-tube boilers now being tried in almost every Navy of the world. Doubtless as these trials proceed the best designs will be adopted, whilst the others will go to adorn the scrap heaps of the various dockyards.

But that any one of the existing designs is destined to be the water-tube boiler of the future, in supersession of all others, would need the gift of prophecy to foresee. There is much difference of opinion and wholesome competition between the advocates of large *versus* small tubes, bent *versus* straight tubes, and tubes that deliver above the water-line *versus* “drowned” tubes.

Large tubes, however, have their disadvantages. The size and weight of a large tube boiler as compared with a small tube boiler of equal heating surface must necessarily be much increased, and when a large tube is split, the rent must necessarily be of greater area and hence of greater danger.

Those who favour straight tubes, and they are many and powerful, say that tubes must be straight because it is necessary to look down them to discover defects, and they must be accessible so as to be cleaned and examined if peradventure these

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\* Past Assistant Engineer J. K. Robinson, in a paper before the American Society of Naval Engineers, on “A War Lesson,” said that, as an outcome of the experience gained in the Spanish-American War, “War conditions that we have found to exist, and that will again exist, require the use of water-tube boilers.”

His opinion seems to be held by most of those who had actual experience of the blockade during the Spanish War. It was then found that it was no easy matter to keep steam up in all boilers and be ready for immediate action for months together. It has been pointed out that on several of the United States ships it was from one or two hours before steam could be raised in all the Scotch boilers and full speed obtained. With bent-tube boilers having small tubes this can be done in from twenty to thirty minutes from cold water.

defects may be prevented, or repaired when discovered. Seeing that a boiler like a human being is but mortal, this is an argument which even Mr. Thornycroft, the able exponent of the bent tube class, would hardly care to attempt to refute. But unfortunately the weight of experience is against the straight tube—has bent it in fact! Or rather let me say that the temperature of the furnace bends it perforce. The “Belleville” boilers of the T. S. S. *Kherson* (with straight tubes) got so badly bent on the voyage to Russia, that many had to be replaced, and the experience on the return voyage was much the same.\* It is difficult to get reliable information about the eccentricities of these “straight” tube boilers, but the facts come to light now and then. In the course of an enquiry into an accident where a “Niclaussé” boiler exploded, evidence was given that these straight tubes curled up in actual service†. The tubes of this boiler are as I said somewhat like “Field” tubes, but are placed at a slight inclination to the horizontal. It is whispered that the same trouble has been experienced with the “Babcock and Wilcox,” another of the straight tube class, as with the “Belleville” and “Niclaussé”, and in the latest designs of the “Yarrow” boiler the makers provide for the use of slightly curved tubes next the fire. It is quite true that in a new and unused straight tube boiler the tubes can be seen through. It is also true that when working well within its powers, and when forcing is never resorted to in the straight tube boiler, large sized tubes will probably keep their form and shape. But with fierce firing and working at maximum pressures on occasion, there is no doubt that these tubes expand unequally and get permanently bent. There is, therefore, much in the contention that straight tubes have not the advantages claimed of them on the supposition that they are straight.

It may at once be granted that the less tubes are bent, the more readily they may be cleaned, but it has long been recognised in Her Majesty's Navy that no boiler of whatever type should be run with impure water, and so long as this is the case and the circulation is perfect the slight extra facility in cleaning is of secondary importance.

As regards the advantage of tubes that deliver above the water-line over those which deliver below it, it is urged that this advantage is neutralised by the greater height to which the contents of the tubes delivering above the line have to be lifted, but, on the other hand, Mr. Thornycroft's experiments with the two boilers, which I have already described, seem to dispose of this contention. Probably, the greatest advantage lies in keeping the delivery as close above the water-line as possible, but certainly as regards priming, that foe to dry steam, it is obvious that this must occur more readily when the steam bubbles up

\* Paper by Mr. C. Gretchin, read before the Institution of Engineers and Ship-builders in Scotland (Proceedings, Volume XL1, page 49), reprinted *Practical Engineer*, Volume XVII, page 581, and XIX, page 14.

† Board of Trade Report, 1898-1899, *re* explosion of Niclaussé Boiler (see *Practical Engineer*, Volume XIX, page 420), says :—

“The arching of the tubes, there appears to be little doubt, was caused by over heating, probably due to imperfect circulation—a common defect of all boilers of this class.”

“It would appear from the above case that boilers of this type are not yet sufficiently reliable to be used on board ship.”

through a tank of water, as in drowned tube boilers, than is possible when the steam leaves the sides in jets of rapid motion, as it does in the "Thornycroft" boiler.

The Navy boiler of the future must be light, strong, simple, safe, a quick steam raiser, economical in working, accessible, cool to the stokers, and must stand any amount of forcing. It is difficult to attain perfection in any piece of mechanism, but the boiler which most nearly approaches these qualities will undoubtedly be adopted if not by us, then by other Navies opposing us. It often happens that a particular design of boiler may fulfil all the conditions required of it, and yet fall short of one or other of these qualities. This may be, undoubtedly is, correct as regards the mercantile marine. But in the Navy, where the conditions of service are so different, a special boiler is certainly indicated. If the design admits of its introduction into all classes of vessels in the service, from the torpedo-boat to the battle-ship then so much the better. The human element is a factor of great moment in this as in most other matters of the kind, whether on land or on sea. The more similarity there is in the design, therefore, the sooner those who have to handle and work it will learn its peculiarities; and so handle and work it as to bring from it the best it can give.

If my conclusions are right, and I think they are, this boiler is unlikely to be the Belleville. Apart from other disabilities, it is not a light boiler as compared with the "express" kind. It is only when compared with the discarded cylindrical boiler that it can be called light. And even if it could be reduced in weight, its design is such, that it could never work satisfactorily on a small vessel subjected to much pitching and rolling. Indeed, for this reason alone, I consider all straight tube boilers having their tubes, like the Belleville, fixed with a slight inclination from the horizontal, to be barred. Let us hope that the Commission of experts now appointed will solve the problem. I hope I have shown how much depends on its satisfactory solution.

#### *Discussion.*

*Sir Edwin Collen.*—In moving the usual vote of thanks, said: "Last year I thought I had terminated the series of occasions on which I had the privilege of appearing before you as Chairman at these meetings, and I was anxious that some one else should take up the duty, but it was pointed out to me that as being responsible for the Marine as well as the Military Department, it was desirable that I should preside to-day, and I am very pleased to occupy once again this familiar position. And here I should like to say one word about the Royal Indian Marine, a service which I have seen evolved out of very small beginnings by Admiral Bythsea and Admiral Sir John Hext—the latter's direction of that service lasting over many years and resulting in its high efficiency—and which is now in the capable hands of Captain Goodridge. It is true our Indian fleet is a small one, but it has long since proved its great value. It is officered by a most admirable body of officers, and quite recently we have seen its worth demonstrated in connection with South Africa and China. The subject of boilers is then not entirely uninteresting to us in India, even from an official point of view, while it would only be repeating what the lecturer has said if I were to lay stress on the

enormous importance the subject assumes in connection with the navy of England and maritime supremacy. I imagine that many present read the discussion which took place in Parliament and the memorandum published by the Admiralty, which seemed to me to sum up the points of the question in a very impartial manner, and only yesterday there was an interesting article in the *Pioneer* which also dealt with the matter, but however much we may be impressed with the importance of the subject there are, I imagine, very few of us who know anything of its principles and technical details, and we are much indebted to Mr. Donaldson for the pains he has taken to inform us. You will not, I am sure, expect me to deliver a judgment on the respective merits of the various boilers of which the lecturer has treated, but I imagine no one will differ from him in his definition of what the navy boiler of the future should be, *vis.*, light, strong, simple, safe, a quick steam-raiser, economical in working, accessible, cool to stokers, and able to stand any amount of forcing. We can only hope that the labours of the Committee at Home may result in the attainment of this ideal. Mr. Donaldson has dealt with the subject in a comprehensive way, and in a short space of time has conveyed a great deal of valuable information to us. The labour in the preparation of such a lecture is very considerable, and I am sure I may offer to him our cordial thanks for his undertaking." (Applause).

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## "NOTES ON THE MORE OBVIOUS LESSONS OF THE WAR IN SOUTH AFRICA, WITH SOME REMARKS ON THE PRACTICAL TRAINING OF BRITISH AND NATIVE TROOPS."

BY LIEUTENANT-COLONEL G. H. OVENS, COMMANDING 1ST BATTALION, THE BORDER REGIMENT.

Mr. Prevost Battersby, the able correspondent of the "Morning Post," writes: "For this war we are paying a big price, but if only its teachings are heeded, we may reap a big profit and lead the way in military development." He divides the lessons into two kinds:—"Those learnt painfully by all men and those laid to heart at present only by a few."

I propose to consider the former only. The following notes on them may serve as a frame-work or scaffolding to be filled in or removed hereafter when we get the opinions of the best men engaged.

If we wait any longer our minds will have such a mass of matter to deal with that it will be almost impossible to arrive at any definite conclusions. Let us therefore lose no time in considering the causes of our failures. If numerous considerations are put forward by many writers while events are still fresh in our minds, no important point is likely to be left out entirely; though many suggestions will eventually have to be thrown aside and many more altered and re-adjusted. With us, war is always imminent and changes and improvements should be tried and tested at once, instead of being left to be experimented on in the face of an enemy—our usual plan.

Further, public opinion, which alone has real power in England, is still deeply interested in these matters. It will be necessary to strike while the iron is hot, and get something done before the usual British *vis inertiae* again blocks all progress. If steps are not taken at once, they will never be taken. It looks as though the recent successes of Lord Roberts are already washing out the memories of early failures. Many of these lessons have been preached over and over again in vain.

In bringing in changes it will be most necessary to guard against the ill-considered reforms which are likely to be brought forward either because those who introduce them wish to pose as progressives, or to ride some special hobby to a front place, or merely because they think some action is necessary. On the other hand, progress now-a-days moves at an accelerating rate, and bold action must not be hindered by the tangles of red tape. Ill-considered reforms will injure rather than profit us; but our forward steps must be long and bold ones. "*Festina lente!*"

D

We must, however, remember that the Boer war is in many respects an unique one. It is unlikely that quite the same conditions will obtain in a future war. In the past we have evidently been guided too much by single campaigns against savages. In them the plan has always been to attack, and the ordinary rules of tactics could often be set aside with advantage.

We should also bear in mind that in the Boer war the fighting took place in a country specially suited to Boer tactics and of a kind far more familiar to them than to us.

Most of the following remarks will refer to the earlier portion of the war :—

(A.) Perhaps the first thing that strikes one in connection with this war is our *unpreparedness*.

Since the days of Ethelred the Unready, we have always been noted for this quality, and it is still a common thing to hear it said "we are always unready and get a knock-down-blow at first, but we always win in the end." Englishmen seem content to have it so. One would have thought that the miserable collapse of the French in 1870 would have opened our eyes to the necessity of being ready for war. Not until after the serious disasters in the Tirah campaign was hill warfare definitely made a part of our instruction, although its methods had been preached and even recorded (in Frontier Force orders) fifty years before. Now again we have had a bitter lesson. Why have our brave troops been mown down and our generals thwarted for so many months by the undisciplined farmers of two insignificant states? Why have we had to spend over sixty millions to overcome them? Because we did not take the trouble to work things up before hand, were not up to date, were in military progress far behind the times; because in fact our army has been neglected.

It is beyond the scope of this paper to discuss the "scarcity of recruits," the thirty-four to forty per cent. of "specials" unfit for foreign service to replace whom all the reserve men and many volunteer companies have been required, the acknowledged deplorable state of the militia, the out-ranged guns, rifles that would not shoot straight after being a short time in use, want of transport animals, utter insufficiency of medical and other officers, etc.

Though this war had been prophesied for years and though the country was half full of Englishmen we entered on it with a most extraordinary ignorance of the country, the enemy, and his resources. The Boers on the contrary, like the Germans, had thought the thing out thoroughly beforehand. (Here I may insert a note that in this paper I frequently refer to German opinions only because they have attempted to work out to the bottom the problems of the art of war.)

(B.) *Expenditure*.—The Boers had spent money boldly. Although a poor and thrifty people, they had laid out very large sums in buying the latest equipment in the way of guns, rifles, field glasses, search lights, etc., besides using

much secret service money to good purpose and paying foreign officers as military instructors. We, though a rich nation, had so shrunk from expenditure that we were painfully deficient in both material and personnel. Our guns, for instance, were quite out-ranged by those of the Boers and only the naval 4·7 inch saved the situation on several occasions. Thirty-five naval guns had to be unshipped to help the army. We were as usual penny wise and pound foolish; the purse strings being tied by fear of constituencies and of questions in the House. Our allotment of secret service money is £10,000 a year only. False economy has cost us millions.

Again we let the poorer nations buy the patents over our heads. Before this war began we could surely have afforded to test and bring into use, if approved, the best kinds of compressed food and a full sufficiency of balloons, search lights, wireless telegraphy and telephotography instruments, traction motor cars, shields, megaphones, smoke balls, observation ladders and other recently suggested aids to warfare. Some of these are only now reaching South Africa. With regard to personnel, we were hopelessly short of medical officers (about 200) and also of combatant and departmental officers. I know of one battalion long under command of a captain during this war and another in which a junior captain was acting as second-in-command for months.

\* Our peace arrangements for transport animals is altogether insufficient. This it was that crippled Buller before Colenso, and Methuen before Magersfontein.

Our regiments are denuded of their best officers, non-commissioned officers, and men to fill staff and departmental billets. Eighteen of the best sergeants were thus taken from a battalion in two years and this is not exceptional.\*

Under the head of expenditure one may also note that during the German manœuvres "dwellings, railways, boats, and supplies" are at the disposal of the forces. No boundaries are set. Extended lines are not compelled to crowd along paths in order to avoid crops. Units are complete, including balloon, bridging, telegraph sections, etc. Whereas with us, even for a staff ride, it is sometimes found inconvenient to detail medical, commissariat or engineer officers. Other items for which we want a free expenditure are for providing materials for field training, for reconnaissance classes, for shooting and other competitions and for rifle clubs; also books of instruction for all ranks. In these things and others which will suggest themselves, officers and men are instructed to a great extent at their own expense, instead of at the State's; staff rides, manœuvres, and camps of exercise should not be a source of expense to officers. One often sees that they are recommended to be held "provided no expense to the State is incurred." The early breakfasts, cheese, etc., for a long day out should not have to be paid for by regiments. Some say that we should not be dependent on rajahs and on private subscriptions for machine guns, horses, hospitals and relief for families of men killed fighting for their country. £4,000,000 of the cost of providing for the sick and wounded has been paid by subscriptions. More ammunition and greatly



increased range accommodation is required. We ought to give extra pay and equipment to scouts, mounted infantry and cyclists, not to mention all combatant non-commissioned officers and a certain number of marksmen.

(C.) We are behind hand in *military education*.

Until recent events our minor tactics were not only far behind all modern developments, but they violated the elementary rules laid down in our own books. Our disasters and losses were caused by such tactics as—

- (a) Making attacks in difficult country without reconnaissance.
- (b) Launching troops to assault in disconnected and fragmentary portions.
- (c) Sending out weak detachments without inter-communication or support.
- (d) Making frontal attacks over a plain when the enemy's guns as well as their infantry were quite unshaken by artillery fire.
- (e) Unlimbering guns close to infantry under cover.
- (f) Making night attacks over ground which had not been properly reconnoitered even by day.

Those who have studied the progress of the war can no doubt fit the names of actions to these paragraphs and add many more, all contrary to our own drill book. This goes to prove that the drill book is not always or even generally the cause of failure.

The theoretical training of officers fails because it consists almost entirely of 'cramming' them with subjects which they seldom have an opportunity of making themselves at home in by subsequent practice. This applies to the staff college course and to the garrison classes and examinations for tactical fitness. So far, however, from abolishing these, I think it will be seen that they are steps in the right direction, the subjects taught being essential for modern war. The greatest excellence in any pursuit is only obtained by combining theory with practice. Even for a polo or foot-ball tournament both are required.

In order then to make theory and practice advance *pari passu* we want technical instruction to be more widely diffused. Do not abolish the staff college, but greatly shorten the course and treble the number admitted. At the same time, select for further instruction some who show a natural aptitude for tactics, fortifications, etc., and from among them turn out real experts in each separate subject. After teaching these officers the art of imparting instruction we should send them out to visit all garrisons as special instructors in order to (a) assist in regimental instruction, (b) set and correct schemes, (c) attend staff rides; (d) lecture to and examine all officers; (e) make comments on field manœuvres; (f) assist in field training, etc., etc. The officers who have succeeded in South Africa will be found as a rule to be those who, like Baden Powell, owe their success to having studied and trained

themselves "out of school" so to speak. Special instructors, such as I have alluded to above, will be invaluable in assisting such efforts on the part of officers, and will supply a felt, though unexpressed, want. Most officers would be delighted to profit by such instruction, but most officers will not study on their own account without such help.

Lord Wolseley says : "I hope the officers of Her Majesty's Army will never degenerate into bookworms. Experience enables me to warn all these determined men of how small their chance is of ever reaching any great position in the army, unless they devote many of their spare hours every week to a close study of tactics." But will officers do this without a guiding hand and the stimulus of working in combination.

To sit and listen to a lecture illustrated with maps and a black board and varied with controlled discussion is a light and easy way of assimilating knowledge. The weekly instruction of officers by the Commanding Officer and second-in-command is a useful aid in this direction, but Commanding Officers have not sufficient leisure to work up the subjects and set and correct schemes.

In order to avoid the disadvantage of officers coming into command, some with no experience of staff work and others with no practice in leading troops, and to escape a certain amount of dullness and unintelligence on the one hand and priggishness and mere clerkliness on the other, I think there should be a rule that all officers be appointed on the staff for say a year of the first ten of their service and no officer should be so employed for more than say three years out of six. Some such plan as this would reduce friction and jealousy. I think the arrangements proposed in the above and preceding paragraphs indicate a system under which reports on officers could be made much more reliable than the present unpopular system of confidential reports.

The Boers, though a most unprogressive people, have fought in accordance with the principles of modern war, as has been evidenced in many ways, and more especially by their bold use of offensive-defensive, or "strategical offensive" and "tactical defensive" tactics. (I suppose these terms to mean the occupation of some position from which the enemy must dislodge you, before he can carry out his further plans. He is then bound to attack you in a selected position. The mungoose *versus* cobra is an illustration of offensive-defensive tactics, and generally has the same result).

Other points which the Boers understand are the defence, the use of sham positions and ruses, and the conduct of retreats. We should also practise these.

(D.) But, though arguing a certain ignorance of the theory of war, the tactical errors noted above, prove still more emphatically our want of practice in tactics and field manœuvres—want of accustoming our officers to independent and responsible command, under service conditions, in time of peace. Instead of affording them opportunities of handling troops, we strangle their power of initiative with red tape, and cram their heads with undigested paragraphs of books without

giving them the exercise necessary to digest them. I have been told that one of our most able general officers has stated that he will not spin an officer in the practical part of his examination for tactical fitness, because officers have so little opportunities of handling troops, that they cannot help making blunders in these simple peace manœuvres.

Infantry tactics and exercises are uninteresting to the public and are therefore apt to be ignored, although infantry forms the main body of our army. The supervision of specially trained staff college experts, as above, under direction of Inspector Generals or of Lieutenant-Generals Commanding, would greatly improve both technical education and practice.

General Officers Commanding have so much routine and statistical work as well as reporting to do that they cannot find time to go into these things thoroughly. Our officers are made of excellent stuff, and the stigma of failure and stupidity should not attach to them but to the system which altogether fails to make the most of the best material.

Almost all the practical instruction for field work of the junior non-commissioned officers and privates in the Infantry is obtained in the annual Field Training and is crowded into twenty-one working days! This again is "cramming." The men like the work and are interested in it because it appeals to their common sense, but the four to five hours a day wearies soldiers who are not accustomed to have four hours' mental exercise in a week. It is perhaps a surprising fact, that during the greater part of the year in India each man of British Infantry gets on an average about two parades a week. Company field training should therefore be supplemented by half battalion, battalion and garrison field training. The Germans add, between company and army corps field training, battalion, brigade and divisional. Except at certain stations, with us there is a gap here, which rather confines opportunities of command to Subalterns and General Officers. Field training is the time when the qualities and value of each man can be learnt by his superiors—a most important point. It is then also that opportunities occur for all ranks to practise responsible command.

To make our army efficient, more time is required for instruction. Men will not mind more work if they do something practical. Even a dog is never happier than when he is engaged at some work which he thinks he can do, whether carrying a stone or herding sheep. We improve and develop men's bodies, but utterly fail as regards making the most of their minds, which is far more important. They themselves want this, though the want can only find expression in grumbling about wasted field days and useless routine. Sandow says, that the value of his exercises is more than doubled if a man puts his mind and will into them. We know how keen Tommy Atkins is, when he has anything to do which involves his action as an individual. We are inclined to make him an automaton, and he does not like it.

(E.) And this brings me to what is perhaps the most important point in modern military development and that is the question whether the training of the future is to be based on developing the *Individual action* of each man, or the old system of making him a mere automatic item in a machine. We ourselves have experience of the latter system, and the Boers are a very remarkable example of the former. Without a regular army and with nothing but the most rudimentary organisation, what have these two insignificant republics accomplished against a first-rate power with overwhelming resources? They have no battalions, batteries, brigades or divisions. In referring to these units correspondents can only describe them as "commandos," which may mean almost anything. They seem to have no brigadiers, colonels, or captains, nothing but "commandants." They have no drill or smartness. Yet they have sufficient power of command and combination to enable them to carry through more bold and complicated operations than our best drilled brigades could venture on without disaster. From all accounts their plan is this:—To very carefully think out and clearly explain to all ranks beforehand what is to be accomplished and then depend on each man's co-operating in bringing it about rather by intelligent individual action than by mechanical obedience to stereotyped methods of drill. Mr. Battersby says "the future is to the army whose individuality is most highly developed." That is the lesson of this campaign. The Boer fights with his instinct. Other's soldiers with their memories. Discipline destroys instinct, and effective training must achieve its re-creation. I think discipline is the wrong word to use here, but certainly the tendency of our system is to make our officers fight with their memories. We always have to think "what is laid down for this case?" Kinglake said about the Crimean war, that our training was calculated to entirely destroy self-reliance, presence-of-mind, decision, etc., and certainly these qualities have been rather conspicuous by their absence in the early part of the late war. Colonial and foreign correspondents have made this painfully apparent.

And yet English gentlemen coming from public school life and fond of sport are naturally supplied with these very qualities, and ought to be the best material in the world for making officers. What remedies then can we use. For one thing, we must increase field training and practical manœuvres, and give all ranks every possible opportunity of individual action. The Germans go on this plan, and seem to make it succeed. In 1870-71 commanders always marched to the sound of the guns without awaiting orders, and in their manœuvres local commanders are encouraged to initiate counter-attacks.

Further we must loosen the bands of red tape and mechanical drill, both to give time for more practical work, and to avoid the cramped barrack square action which has told so injuriously of late.

We must, however, guard against the very serious risk of injuring discipline, the value of which cannot be overstated. Murray, who has written an excellent book on discipline, attributes it to the effect of repeated drilling which accustoms a man to act in a certain way

mechanically on hearing a certain word of command. No doubt exact drill does produce this result. However, the author of "The battalion on the frontier," a commanding officer who has gone deeply into these matters, writes that "instead of individual action causing loss of control, commanding officers will find greater keenness, an appreciation of the greater responsibility, and a self-control on the part of the men." If this is the case, we can cut out much precise drill and ceremonial and gain time for more practical work. It may be that extended order manœuvres, skirmishing, etc., if strictly carried out, will induce discipline as much as precise barrack square drill has done in the past. In the Navy discipline is better than in the army, but there even middies often have opportunities of independent command. Instinct like that of the Boers is not so much born in a man as produced by his mode of life, for habit becomes second nature, so, by training our men to know country, use cover, etc., etc., we may make these habits as instinctive with them, as "right turn," "left turn" has been hitherto.

Intelligent individual action should be made the aim of their instruction, not precise drill. A longer course of squad drill will be necessary, and they will have to be practised in fighting on by themselves; officers and non-commissioned officers becoming casualties. More time is absolutely necessary for more advanced training. At present a British infantry commanding officer can hardly get parades enough to keep his men up to the mark in ceremonial and the simpler manœuvres. Longer hours of drill and a certain loss of showiness will not injure recruiting as the public can now appreciate practical soldiers. A better class of men will be willing to enlist.

In addition to giving up cramped barrack square and ceremonial drills, time also may be gained by relieving officers and non-commissioned officers of much routine work which should not form part of the duties of combatants. An amusing letter lately appeared in the "Pioneer" which showed that an officer had to be a clerk, an accountant, and a grocer first, and a soldier afterwards—a long way afterwards. This indictment is true and you may add in, "a haberdasher and a butcher as well, and a caterer for public amusement." It is chiefly on these things that his professional career depends. A combatant officer should go in for sport and games—most valuable training—and these, with practical manœuvres and military reading take up all a man's time. The many hours spent by officers on court-martial and by waiting about the orderly-room and by non-commissioned officers and men on guard, do not improve their fighting efficiency—just the contrary. Yet most of our time must be given up to these occupations and to non-essential drill and exercises; and promotion largely depends on them. Except at Field Training, hardly thirty hours' instruction in the practical part of fighting such as skirmishing, outpost duty, can be got in in the twelve months by British Infantry in India. Last summer it was decided by the authorities that drill before breakfast was not advisable, and just before this the Senior Medical Officer of a station had ordered that men should not be on parade after 8 A.M. This left twenty minutes for parade!

Money is required to obtain the use of ground for practical manoeuvres, to pay expenses of transport, etc. Even this year, in spite of the experiences of the war, the amount allowed in India is altogether inadequate for the carrying out of camps of exercise, etc. I think it amounts to six annas a man.

(F.) Scouting was much talked of after the Tirah campaign and many regiments in India have profited thereby, but there appears to have been so much delay in working up the question generally that scouting in South Africa both by cavalry and infantry by day and by night has been a failure. Our generals have had to work without the "eyes and ears of an army" and many disasters have resulted. Our cavalry are far too heavily weighted and are not sufficiently highly trained. Probably in the future scouting and screening will rank as far the most important duties of cavalry.

There seems to be a growing opinion that shock action will be the exception and only a few regiments should be retained for it, the rest becoming light cavalry pure and simple as recommended years ago by General Luck, Inspector General of Cavalry. If some of the Colonial mounted corps could be absorbed among them, we should get a valuable body of men with natural scouting instincts—able to beat the Cossacks at their own game and to become as famous and effectual as the Uhlans were in 1870-71. Of course such men would require more pay, and they would be well worth it. At present they receive 5 shillings a day to our men's one shilling and three pence. It has been suggested that mounted infantry should take part in the scouting and screening. I think this would be a mistake. The "Times" correspondent writing of the mounted infantry from Bloemfontein says that "it must not be frittered away in patrols, observation parties, scouts and advanced guards. These are the duties of cavalry. Hitherto we have spoiled good infantry by using them as cavalry. They cease to be infantry and become irregular cavalry and bad at that". Large numbers of mounted infantry will probably be required in the future; and in their short service it is impossible to turn many of our infantry men into the highly skilled scouts demanded by modern warfare. Besides cavalry men are already partially trained as scouts and are better fitted for the work especially as scouts must be able to ride well and look after horses properly.

To compete with the achievements of Sheridan, Stuart, and Forrest, we must teach our cavalry more dismounted action and arm them with long range weapons. As to whether those are right who say that light cavalry should carry neither sword nor lance I cannot venture an opinion. I think they would find a hunting knife useful when scouting and foraging. It might also be made adjustable as a kind of bayonet.

With regard to infantry scouting, we profited greatly by their use in our recent frontier campaigns, some men having been trained by the special efforts of certain officers. The general instruction and provision of infantry scouts, however, was very slowly taken in hand, and they have not been in evidence in South Africa, *vide* Stormberg,

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Magersfontein and other disasters. As long ago as the Russo-Turkish war Graf von Pfeil, a German officer, wrote "the plastuni (foot Cossacks) distinguished themselves and made themselves especially dreaded by the enemy." In the German army infantry scouts are employed to creep up to and reconnoitre the enemy's position which modern long range weapons make it impossible for mounted men to do. A *Times* correspondent from South Africa mentions that cavalry could not get within 1,500 yards. At the same time smokeless powder makes it necessary to approach very close in order to locate guns, etc. Of course this is only one of the numerous cases in which infantry scouts are essential, as any one who has them in his battalion can see. Assisted by officers they are also useful to act as sharpshooters in advanced posts, to supply patrols and flankers, outposts and advanced guards, to cover retirements, to find best paths for advances and retirements, to reconnoitre by night, etc., etc.

Scouts trained in accordance with Baden Powell's book will be invaluable, but such cannot easily be turned out regimentally. A school of instruction will have to be formed and some American or similar scouts employed as instructors. An officer or two and some selected non-commissioned officers should attend to qualify as regimental instructors and should receive extra pay. The scouts will be so valuable that Government might well bear this expense, and also that of equipping them with field glasses and a practical uniform. They should also receive substantial inducements to extend their service. Inspection of scouts should form a special part of the duties of Inspector Generals or Deputy Assistant Adjutant Generals for instruction alluded to above. Prizes should be sanctioned for competitions in scouting such as the "Spider and fly," "Tracking and sketching," "Flag stealing," etc. Regimental and supernumerary scouts should be recorded in orderly-rooms and badges issued.

It may be noted that many of our native troops, such as Gurkhas and Pathans, shew a special aptitude for several branches of the art of scouting.

This brings us to:—

(G) Skirmishing—a point in which we are far behind the Boers. It is now very evident that unless men learn this branch of soldiering, they will often be unable to advance and may be prevented from retiring also. In this too some improvement has been made since the Tirah campaign; and I have seen a letter from an officer in Natal, who says how very many fewer casualties occurred in those battalions which were able to advance and retire by driblets making use of cover. Skirmishing with its varied branches of creeping over the open, use of hollow ground, passing obstacles, moving up man by man from the least exposed flank, rushing in swarms, etc., is an art in itself; and a neglected one.

To teach it to a raw recruit requires patient and elaborate training. It should be made a *sine-quá-non* with all recruits that, before being dismissed drill, they should pass in skirmishing. They should be taught how to take cover, where to look for it, how to fire from it.

Skirmishing should form a most prominent part of field training both of the individual, and collectively, including cover in defence and retirements. The men should be given an object lesson by having to fire at partially concealed figures on the range.

Skirmishing is an opportunity for each man to act on his own initiative without losing sight of the intention of the commander. Non-commissioned officers should be made casualties and the men encouraged to fight on by themselves with confidence. To pass back intelligence reliably, is one of the other numerous important points in which more instruction is required, for skirmishing and scouting and the attack. Also men must be taught that keeping up an effective fire is often more protection than looking for cover. The extension should take place out of the sight of the enemy as men in khaki when once extended, using smokeless powder, are almost invisible at long range distances now prevailing.

As for scouting, so for skirmishing, competitions can be devised to make men more keen. For instance, an officer may be placed in the supposed enemy's position and note how many men he can see, of different squads, skirmishing in succession towards him over a piece of rough ground. Skirmishing formations are of course useful for advance, flank and rear-guards, for containing forces and for approaching near enough to a position for the commander to reconnoitre it. But skirmishing will often be the only way in which an attack to take a position can be carried out as the advance in regular attack formation will be sometimes so exposed as to be practically impossible. A great drawback to skirmishing in open country is the great length of time it takes to approach an enemy by this stalking process.

The attack is not quite a thing of the past. Flanking movements have to end in an attack, rear-guards must be attacked, and there will always be positions so important that they must be taken at all hazards and without delay.

The extensions must take place at a greater distance from the enemy or else under cover and with a much greater interval between men. No troops can be retained as formed bodies within miles of the enemy, but the supports and reserves must extend, so that the attack is practically in successive extended lines. The Germans start with 400 to 500 yards distance between them. In this way the most dangerous zone will be passed in controlled swarms. It will often be impossible for the fire of the defender's guns or rifles to be silenced or even shaken beforehand, as they will be concealed in deep trenches using smokeless powder. For the same reason it will be waste of time and life for the attacking troops to halt and fire at an enemy they can't see till they get close up. Continental opinion seems to be in favour of not firing between 900 and 400 yards, the advance being carried on as quickly as possible, supported by flanking fire from other troops and artillery. But this kind of attack is likely to prove so costly as to be rarely practicable. Fire by reserves and supports also takes place occasionally. Anything like control or command is



almost impossible at medium ranges, and it is necessary to rely on small units and individual men fighting on by themselves in accordance with the general instructions of the commander. Hence the great value of trained individual action and previous explanation. It seems probable that shields will be employed for ammunition carriers such as those invented by Major Boynton and weighing thirteen pounds, and reserve ammunition may be carried on occasion in armoured motor-cars. Other means of attacking a fortified position will be by sapping and mining and possibly also by troops approaching at night and entrenching themselves or using some kind of shield. The transport of shields would be often impossible.

(J.) The value of constantly throwing up entrenchments was proved in 1862 in the American war and has been further emphasized ever since, especially in the Russo-Turkish war of 1877. Germany and other continental powers give a spade to every fourth or fifth man. Now-a-days they would be best carried on mules or in carts. The Boer entrenchments were on such a bold scale and so well placed and concealed that the hottest fire of rifle bullets, shrapnel and lyddite seem to have had extraordinarily little effect. A correspondent of the *Morning Post* states we had one hundred and twenty guns firing at Cronje's laager at Paardeberg, and a writer in the R. E. Journal says Cronje only had "fifty men killed out of all that furious bombardment." Of course the ground favoured him. Cronje's trenches were at least four feet deep hollowed out in front and were protected by good head cover, by traverses every few yards and by a zig-zag trace which neutralised enfilade. On February 27th 400 Boers kept the top of Green Hill against 6,000 men and fifty guns for about three hours. They had a deep trench and a wall six feet thick in front of it. Our trenches are said to have merely the effect of affording marks to the enemy's guns. We appear to have omitted throwing up entrenchments by night and carrying on sapping by day as a means of approach to such positions as that of Colenso and the Tugela. It might be well worth while also experimenting with some kind of shield for men digging trenches. Barbed wire seems to have been useful as an obstacle especially in fords.

(K.) *Sharpshooting* or more practical shooting at small and moving objects at unknown distances and under service conditions is another, want in our system. Though not better shots at stationary targets, the Boers have shown themselves far better judges of distance, quicker in getting their aim, selecting their targets and making sure of their shots. From the recent departure in the musketry course ordered for certain native corps and the new application of the extra eighty-one rounds to practical subjects, it appears that the authorities in India have acted already in this matter. I think to do away with the figure of merit is a mistake. Companies competing against each other improves the shooting. Money will be required to make suitable ground available for the development of field firing and for supplying requisites and supporting rifle clubs. At present the good shooting of men is largely due to their own subscriptions to rifle clubs and to

the extra exertions of keen officers. Troops should only be quartered where ranges could be constructed close to barracks.

(L.) *Guns*.—The Boers made great use of long range guns. A *Times* correspondent says "it is demoralising to receive fire without the power to return it. On March 8th a 9-pounder on the Lieuw kop was pitching shells quite easily amongst our Naval 12-pounder guns whilst the latter were unable to reply effectually owing to the enemy being beyond their range."

If Naval guns were out distanced how much more the military. The former saved the situations at Ladysmith and on many occasions.

We therefore require more long range guns. We also want carriages for them instead of having to trust to officers like Captain Scott improvising them on the spot. The Boers appear to have been able to move their big guns to almost inaccessible places boldly and freely and also to withdraw them in safety with extraordinary quickness. They also kept them concealed until the critical moment with great effect. Germany has long recognised the importance of concealing guns till the effectual moment. They are unlimbered behind a crest and run up by hand when required.

Evidently, too, more effectual projectiles are necessary in view of the modern progress in entrenching.

(M.) As regards *mounted infantry*, we seem to have read the lesson of the American war in vain. The Boers have only rubbed it in again. Our numbers appear to have been insufficient and our training not of the right kind, *vide* Lord Denman's criticisms in the *Nineteenth Century* for May and the letters of various correspondents. In addition to their rapidly seizing important points, covering retreats, etc., the mounted infantry have been specially reliable in supporting cavalry in wide turning movements and in re-enforcing weak or hardly pressed points in a thinly held line. Their horses must be suited to covering great distances rather than to drilling smartly on parade. The Central Asian tribes who formerly traversed hundreds of miles in their raids in record time objected to smart collected action in their ponies, preferring a long loose canter as less fatiguing. It appears that in future our mounted branches must have some of their belongings carried on spare horses or galloping carts to enable them to travel lighter. They must also all learn the care of horses in the field, *vide* Lord Roberts' remarks in orders. I think the present system of denuding infantry regiments of their best men and turning them into indifferent mounted infantry has proved itself a poor makeshift. Lord Roberts has made use of mounted infantry in battalions, and it seems advisable that they should become a separate corps in the future. Their officers and non-commissioned officers should be put through a course of special regular training. I think they should carry a hunting knife instead of sword or bayonet to fit on the rifle if necessary. It has been suggested that some of our sappers should be mounted to enable them to accompany mounted infantry and cavalry.

(N.) In *mobility* the Boers had the advantage of us. Partly on this account they were able to extend very thin lines of defence to stop our advance, and move men rapidly to strengthen any point threatened before we could arrive. Long range fire causing an attacking force to deploy at a great distance will render this plan easy to accomplish. This and smokeless powder makes it very difficult to reconnoitre a defensive position, and the Boers increased this difficulty by entrenching sham advanced and flanking positions, their mobility enabling them to evacuate these rapidly. Their mobility has been further demonstrated by their swooping suddenly in detached forces, by their bold wide blows at our communications and by the very remarkable way in which they have eluded largely superior forces which appeared to have hemmed them in. Like the Afridis they had the advantage of not being tied by much commissariat, but even when they had wagons with them they were wonderfully successful in getting them away in spite of our large mounted forces. It was the same also with their heavy guns. With these it is said they used bullock draught on ground where we employed men to haul. Our transport required reorganising *de novo* in front of the enemy.

(O.) The Boers possessed *other advantages*. The Government of the Transvaal was practically in the hands of a single man whose one idea was to defeat the British. For this purpose he could wield the resources of the whole country unhampered. Whereas with us the first consideration is will such and such a measure commend itself to the public. Will this or that expenditure be approved of by the constituencies? In times of National stress the Romans found it pay to elect a dictator. We might at least give our Commander-in-Chief a free hand both before and during a war. His being *ex-officio* a member of the cabinet might be a step in the right direction. At the end of January last Lord Salisbury said in the House of Lords: "I do not believe in the British constitution as an instrument of war \* \* \* it is evident there is something in your machinery that is wrong." The subordinate position of the Commander-in-Chief is most obviously one thing that is wrong.

The physique of the Boers was good. They live an open air hard life, and also a temperate one, whereas our young soldiers especially town recruits have been very differently brought up.

It is a question whether a stiffening of older soldiers would not more than balance the consequent reduction in the Reserve. The reserve men are said not to be able to stand hardships.

We might bivouac out more often in manœuvres when the men could learn the many dodges to add to their comfort. The Germans bivouac frequently being given merely wood and straw.

Some of the disadvantages of the Boers have been very bad discipline, an absolute lack of offensive tactics, want of a bayonet or its equivalent and the great mistake they made of not commencing the war three weeks sooner,

## SUMMARY.

I will here enter a summary of some of our obvious lessons—

“A” To give instant careful attention to *preparedness* in men, material, and information.

“B” Bolder *expenditure* on up-to-date equipment and a complete personnel, on ground and material for practical manœuvres, on relieving officers of unfair expenses, on extra pay, and equipment for non-commissioned officers, scouts, mounted infantry, etc.

“C” More widely diffused military *education* by special experts, instead of cramming.

“D” *Practice* for all officers and men in improved Field Training under real service conditions with an eye to development of (E) self-controlled, *individual action* and fighting instinct, leading to self-reliance and readiness of resource. Barrack square drill, guards, mere routine, and civilian work to be greatly cut down with a view to giving combatant troops more time which is absolutely necessary to keep in line with modern progress.

F. Further instruction in cavalry *scouting*—cavalry becoming true light cavalry.

G. *Skirmishing*.

H. Modification of the *attack*.

J. *Entrenching*; combined with

K. Practical *sharp-shooting*.

L. Provisions of long range *guns* and carriages.

M. Augmentation and training of *mounted infantry*.

N. Increased mobility including a new transport system on an efficient scale, also the consideration of new features of tactics, such as the offensive-defensive, long thin lines of defence; wide turning movements; and blows at communications, sham positions and retirements, ruses, etc. Also the fact that if defenders allow the attacking forces to approach, they can often prevent them from either advancing or retiring and hold them until night-fall as at Wepener and other places.

This is part of the “day after day” fighting now becoming common.

I should here add that the above notes do not pretend to be anything but a réchauffé of general impressions. This paper may appear to set forth a pessimist view of the subject as I have omitted to speak of the bravery and keenness of our men, and of the very great achievements performed in many ways, but the urgency of the questions at issue is very great and most of them have been preached in vain over and over again.

It is an unavoidable disadvantage in the army that neither Tommy Atkins nor his officers get opportunities of giving expression to any feeling they may have that things want improving. They can only grumble and lose interest in their work. Other communities can agitate and write to the papers, but not so the soldier.

"His not to make reply  
His but to do, and die."

He has been dying a good deal in South Africa lately, and England has actually awakened to the fact that some one has blundered. It will be a pity if the message of the brave men who lie on the veldt be once more stifled by red tape, or be smothered by paltry politics when the war is over.

*P.S.*—Since writing this paper the instructions of June 22nd have been issued from Army Head-quarters, and have made several of my remarks unnecessary. Mine are merely crude comments especially as regards cavalry and artillery of which of course I know very little. I do know, however, that infantry progress deserves more consideration than it receives, and that regiments of British Infantry should not be denuded of non-commissioned officers and men for better paid non-combatant billets. On the contrary, the pay of combatant non-commissioned officers should be raised if the country requires an improved army. I may here conclude by quoting from the Duke of Bedford's famous speech, after saying that there are three alternatives for imperial defence, *viz.*, an inadequate army, conscription, and a substantial increase of pay, he adds: "It is to an increase of pay to which I should look for that increase in the quality and quantity of the raw material which the military needs of the Empire now demand."

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## THE USE OF LIGHT RAILWAYS (2' 6" GAUGE) IN INDIAN WARFARE, AND THE ORGANISATION AND WORKING OF RAILWAY CORPS.

BY MAJOR W. J. K. DOBBIN, 1ST SIKHS.

Motto: *Deus aexter meus.*

The battle of the gauges appears at last to be ended, as far as our light military railways in this country are concerned, in the apparent adoption by the present Indian Government of the 2' 6" gauge as the normal one for such railways on the frontier. It was only the other day that the late Government expressed a preference for a 2' gauge for the proposed Naoshera Dargai and other similar railways. Now, as one of the immediate consequences of the "New Frontier Policy," it has been decided to construct the above-mentioned railway at once and on the 2' 6" gauge; the work of construction has been begun, and is being vigorously pushed forward.

Before proceeding further it may be as well to define some of the technical terms most commonly in use regarding railways:—

*Gauge* is the clear lateral space between the inner edges of the two rails composing a line of railway.

Technical terms.

*Formation* means the earthworks (including tunnels, cuttings) required to construct the roadway.

*Permanent-way* is the collective name of all the materials which are used in the laying of the rails, and consists of rails, sleepers, chairs, fastenings, etc.

*Ballast* is the bearing surface prepared for the sleepers to rest on, and is generally composed of gravel, broken stone or brick.

*Chairs* are special structures used to secure double-headed rails to their sleepers, and are generally made of cast-iron.

*Fishplates* are iron plates placed on both sides of the rails at their extremities in order to join separate lengths into one continuous rail.

*Rolling-stock* includes locomotives, passenger and goods carriages, and wagons.

We English have been the first to make a practical use of railways for war purposes. The Balaclava railway in the Crimea was the first strictly military railway temporarily constructed as a line of communication. Since then we have utilised railways in Abyssinia, Afghanistan, Egypt, Suakin, and last, though not least, in the Soudan. Some of these railways were only temporary, while some have become permanent, and form main routes at the present day.

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With reference to the temporary construction of railways in connection with military expeditions, we can't do better than study the American railway system.

In the States, railways were, in the first instance, nearly always constructed as "light" or "pioneer" lines.

**The American system.** Being a new undeveloped country, in order to open it up and develop its resources, the construction of railways, of some kind or other, was an absolute necessity; and as in the beginning the railways could not be expected to pay, they had to be made on the most economical principles, and so the pioneer railways (and all were at first "pioneer") were made as lightly and cheaply as possible.

But there was one *sine quâ non* carefully observed in all cases; no matter how light the new railway might be, it was invariably constructed on the standard gauge.

There was but one gauge common to all the States' railways.

Consequently all the materials, plant and rolling-stock in use on the older railways were available and suitable for the use of the pioneer railways; and so the old rails, sleepers, woodwork of buildings, bridges, etc., discarded in the renewals of the standard or older railways, were available at small cost for the pioneer railways.

The only *desideratum* for the latter was a light form of locomotive, as the new light lines were not sufficiently substantial to bear the standard locomotives in general use.

With slow speeds and light loads the pioneer railways could be constructed very light indeed, and quite adequate for their purpose; but of course the traffic was of a light description also.

As economy and a fairly rapid rate of construction were prime factors of these new railways, they at first consisted of single lines, which made a great saving in time, in the dimensions of the railway formation, and in all the materials required for the permanent-way. For bridging, wood was invariably used, and also for all buildings, platforms, etc.

Flat-footed rails were adopted, which, placed directly on the sleepers, could be fixed on the permanent-way without ballast.

Land could be had for the asking, and wood for merely the cutting.

With slow speeds and in a sparsely occupied country, all the expenses of fencing of every kind could be, and were, dispensed with.

Consequently the pioneer railways were able to keep pace with the spread of immigration, and, with civilization in their train, created the industries and wealth out of which they subsequently made themselves pay.

Constructed in the beginning as above indicated, these pioneer railways were gradually improved up to standard requirements; second lines were added, and permanent buildings and bridges took the place of the temporary structures.

And I think that some such system of branch or pioneer railways, for opening up the savage borderland on our N.-W. frontier, might well be adopted.

Constructed in the first instance with a special view to military and political considerations, they would, in the due course of things, spread civilization in their wake, tap and create industries hitherto little known, and finally win the confidence and support of our uncivilized and wild border neighbours, and probably do more to civilize these people in one generation than all our numerous expeditions, geographical and others, of the last fifty years have done in that respect.

But such a system of frontier railways would differentiate in certain essential features from the American system.

In the first place, it would be on a very much smaller scale: the pioneer or branch lines would, at the furthest, only extend from certain termini on our standard frontier railways up to the Afghan border.

In the second place, there would not be one standard gauge to which we could confine our enterprises, with its attendant advantages of an unlimited reserve of materials, plant and rolling-stock, but we would be obliged to select one out of several gauges.

In the third place, such lines could not be constructed as light lines in the American acceptance of the term, because in case of their utilisation for military expeditionary purposes, their primary *raison d'être*, they would be subjected to a constant and abnormally heavy traffic, to sustain which they would have to be constructed and equipped on a very efficient and thorough scale indeed. And so, to secure the *desiderata* of rapid and to a certain extent economical construction, we are obliged to have recourse to light lines of a specially small gauge, but still such as will be adequate for all military purposes.

Now the multiplication of different gauges is most vexatious, impolitic and unstatesmanlike, and especially so in a country like India. We hold India for its good, but still *we hold it*, and the preservation and extension of the railway system of the country is one great means we possess for the maintenance of our power. It is not difficult to imagine a crisis in which large reinforcements of rolling-stock from home would be most welcome and of incalculable benefit; but of such a reserve we have hitherto absolutely deprived ourselves. How? By adopting gauges in India different from the normal and standard gauge of Great Britain.

In England the standard gauge is 4' 8½". In India we have practically two standard gauges, the 5' 6" gauge and the metre. Oblige! then to select a special gauge for our military frontier railways, let us choose one which is common to railways of this class not only in India, but if possible in England also, so that in case of necessity we may have a railway reserve of stock to fall back upon.

Adoption of special gauge already used both in England and in India.



The 2' 6" gauge fulfils this condition, as it is the gauge of most of the small gauge lines in India, such as the Geakwar's Dabhoi, Cooch Behar, Morvi and others, and it is also the gauge of special military lines at home.

This choice the present Indian Government has made, and I hope once for all. In this connection it is fortunate that the 2' 6" gauge is coming into favour in Bengal, where a different gauge from the standard gauges is less open to objection, owing to the existence of various wandering rivers, which in some cases inevitably necessitate a break of gauge.

I see from *Indian Engineering* of January 27th of this year that on the S. M. R. three new light lines on the 2' 6" gauge have been sanctioned: the total length of three lines is 113 miles.

The great objection, from a military point of view, to the adoption of different gauges on the same main route is the break of gauge, necessitating, as it does, transshipment, which chiefly of course affects the goods traffic, with all its concomitant evils of delay, confusion, divided responsibility, loss, and extra expense.

It was in consequence of the experience of these great drawbacks, that after the Afghan war the line from Jhelum to Lahore, at first constructed on the metre gauge, had to be re-laid to the standard.

The following suggestions\* made to obviate, as far as possible, the inconveniences of a break of gauge, are worthy of note in the construction of special narrow-gauge lines which could make connection with standard gauge routes.

Firstly, a system of four rails, the narrow-gauge inside the broad one on the same permanent-way, a break-van being used having normal side-buffers as well as a narrow-gauge lower central buffer. This van could be used to link up the wagons of both gauges, and so enable them to be hauled by a locomotive on either gauge whenever required.

Secondly, a system of three rails, as in the case of a light railway on a small gauge which connects certain watering places between Ostend and Nieuport, and has running powers over two miles of the standard railway, an intermediate third rail being laid down to the smaller gauge. During the season 11 trains of the broad-gauge and 8 trains of the narrow-gauge run in each direction daily over the three-rail section of the line.

Thirdly, means to facilitate loading and unloading, as trucks consisting of simple platforms, on or from which cages, in which the goods have been packed in the first instance, can be swung by a crane. For ordnance material the cranes would have to be very powerful.

Fourthly, the construction of broad-gauge trucks on which the narrow-gauge wagons could be bodily lifted up and placed; but this proposal involves specially designed stock.

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\* Light Railways (Cole).

Fifthly, the construction of a specially designed transportation car on the narrow-gauge to carry a broad-gauge wagon which would straddle it.

The last suggestion is hardly practicable.

The advantages possessed by the 2' 6" gauge over the standard or other broad-gauges, from the point of view of our subject, are the greater rapidity in construction possible, because—

- (a) the weight of the permanent-way, including rails, sleepers, etc., is proportionately less, and therefore these materials can be more easily and quickly carried and laid. The permanent-way of the 2' 6" gauge weighs about half as much as that of the 4' 8½"; the standard gauge rail weighs 80 lbs., while that of the Barsi railway weighs only 35 lbs.;
- (b) a proportionately smaller quantity of ballast is required, or
- (c) in certain cases ballast may be dispensed with altogether;
- (d) of the saving in extent of earthwork from the difference in width and extent of formation necessary;
- (e) the lay of the land can be followed more closely because of the adaptation of the smaller gauge rolling-stock to sharp curves;
- (f) platforms are only required for the goods traffic, and need only be 2½ feet high;
- (g) the portability of the permanent-way makes temporary extensions easy, and the line can be shifted as required.

Also where the line is laid on a public road, the space occupied by the railway and that left for ordinary traffic depend entirely on the gauge, and every foot of room is important.

Lastly, the narrow-gauge is obviously the most economical.

The average cost\* of the construction of the 5' 6", the metre and the 2' 6" gauges is, respectively, Rs. 1,20,000, Rs. 75,000 and Rs. 30,000. Also owing to the slower speed on a small gauge line, the average for a 2' 6" gauge being 15 miles an hour, there is less vibration than on standard gauge lines, and therefore less wear and tear to stock.

It may not be out of place here to note something of the work required to be done in the construction and working of railways, and especially light railways. The first step, of course, is a reconnaissance or survey of the route proposed for the railway, which is just as elaborate a business for a small as for a broad-gauge line. Within our old border limits our frontier roads are now so good, of a sufficient width, well metalled and maintained, and provided with good substantial bridging, that they could generally be utilised in the construction of our proposed military railways. But it is when we have to cross our old borders, and, leaving our own highways, have to follow the natural and only highways of the trans-border, that our difficulties begin.

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\* Light Railways (Cole.)

These highways consist of stony *nullahs* or river-beds which take their course through a succession of narrow valleys separated by rocky gorges and passes. Where valleys intervene with longish stretches of low plateaux or *kachi* land, and the passes are not too narrow or rugged, the construction of a narrow-gauge railway presents no considerable difficulties whatever.

Where the line would have to follow the bank of a stream there would be much bridging in the way of culverts; where the line would lie along the immediate foot of hills, landslips and the fall of *débris* would have to be guarded against: so, when possible, a middle course should be selected.

Also for rapid construction, all cuttings and extensive earthworks should be avoided as far as possible.

The actual alignment of the proposed line having been marked out and decided on, the work is begun. Now, the more simultaneously the different kinds of work can be carried on the more rapid the progress will be. Hence the works of formation and of plate-laying should proceed at the same time, and consequently these operations should be quite distinct and under separate supervision, and while skilled labour would be necessary for the plate-laying, the actual construction of the formation might be carried out by large gangs of coolies under overseers, and in as many places as possible at the same time.

All tunnels should, of course, be avoided, and where a choice is possible between cuttings and embankments, the latter should be adopted for preference, because they practically impose no limit to the number of workmen that can be employed, while the only means of expediting the work of a cutting is to have the requisite reliefs at hand; only a limited number of men being able to work at one time.

The material for the embankment would generally be taken from borrow-pits alongside, such as one may see from any of our Indian railways—gravel or sandy soils are best.

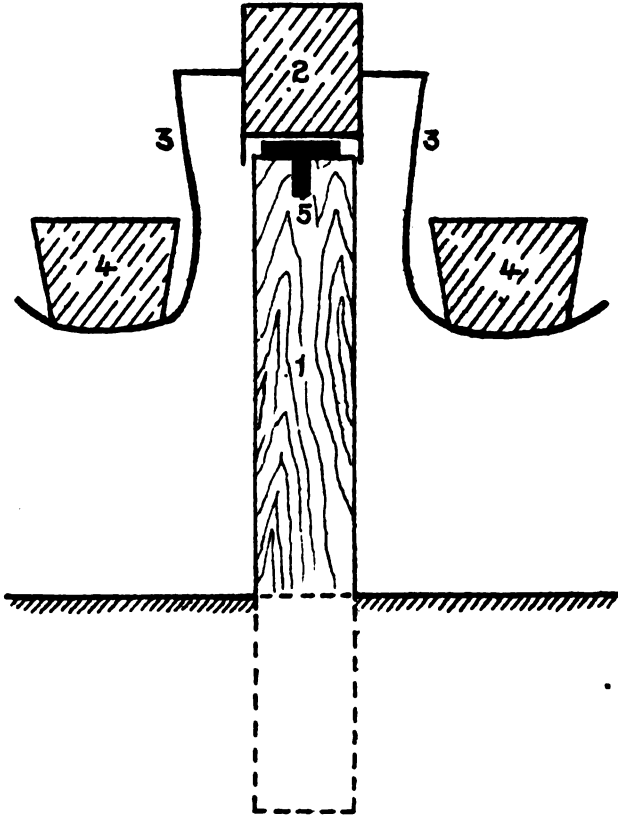
The earth is usually carried either in hand or wheel-barrows, or on donkeys, but\* the following system is well worth noting. It has been tried by a frontier engineer and found most excellent. Along a distance of some 400 yards he erected a row of rough wooden posts about  $3\frac{1}{2}$  feet above ground. On the top of these posts, which were placed about 5 feet apart, a T iron was laid to carry the trucks which were simply wooden boxes, about  $4' \times 1\frac{1}{4}' \times 1'$ , supported *Kajawah* wise by two wooden wheels and iron brackets. One coolie was easily able to push three laden trucks containing 36 cubic feet of material.

A sufficient section of the formation having been prepared, the plate-laying of the permanent-way should begin.

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\* Plate I.—Conveyance of material for formation.

PLATE I.



1. The post  $3\frac{1}{2}$  feet above ground.
2. The wheel of sheet iron.
3. The brackets.
4. The trucks or boxes.
5. The T iron.







Griffin's sleepers.

The gauge is kept true by the tie-bar. The full-sized clips average but 16 lbs., and fish-plates are dispensed with altogether.

Ordinary double-headed rail on Griffin's sleepers.

The transverse, in which the sleepers are placed at intervals under the rails, is the usual kind of permanent-way in vogue. The double-headed rail, familiar to most of us, is generally used in England; when a bit worn it could be reversed, but the flat-footed rail is preferred for Indian railways, it can be laid directly on the sleeper without the intervention of the chair entailed by the former kind of rail.

Steel rails are rapidly superseding iron.

\* Steel rails laid down for three years have been known to outlast 16 pairs of iron rails, the former were still serviceable.

Also, in India, on account of the white-ant, iron and steel sleepers are much used.

For timber sleepers mature trees only should be employed. Oak is the best kind, but deodar is much used.

It is unnecessary for me to go into the details of plate-laying which is most interestingly described in Part VI, Military Railways, in minute detail, but I would point out that for small gauge lines constructed on the portable ladder system the method of laying is to make up certain rail lengths with their sleepers attached to them ladder-wise, previous to their being placed on the road, which enables the line to be laid very rapidly.

There is also † a special type of permanent-way devised by Mr. Griffins' sleepers. Griffins which is worthy of note chiefly on account of the sleepers, for which timber of almost any description, shape, or size can be used, sawing and boring the wood being all that is necessary. The accompanying plate shows the ordinary double-headed rail fixed on Griffins' sleepers.

I will here simply give a description of the Barsi Light Railway ‡ which is on the 2' 6" gauge. It is a successful example of a line laid on a public road. The line which has been allowed to use the public road is a single one, 21 miles long.

The road had been constructed by the Bombay Government in 1870 for the purpose of a light railway. The line was opened in 1897.

It occupies a width varying from 6 feet on the road to 9 feet on the bridges. A roadway of 12' 6" is left for carts on the bridges and is railed off. The sharpest curve has a radius of 450 feet, and the sharpest gradient is 1 in 88.

The permanent-way consists of 35lbs. (to the yard) steel flat-footed rails, and steel sleepers, with 7 cubic feet of broken stone and moorum ballast to the foot-run.

The fish-plates weight 12½lbs. per pair. The steel sleepers weigh 50lbs. each; they are laid 10 to the 24 feet road; on bridges wooden sleepers are used.

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\* Light Railways (Cole).

† Plate II.—"Spons' Dictionary of Engineering."

‡ "Light Railways" (Cole).



The train load on a gradient of 1 in 100 is 260 tons; the train consisting of 12 wagons and one brake.

I especially cite this line because it has been constructed as a first-class line on a narrow-gauge, and it has been laid on a public road which had some years previously been specially made with a view to such a contingency.

The use of the narrow-gauge 2' 6" railway in Indian warfare would, I take it, be generally confined to extensions or short branch lines, from existing termini, up to or into the hills on our borders. For instance, such a line from Khushalgarh (where a break of gauge is necessary) *via* Kohat into the Miranzai Valley, and which might well have been constructed after the first Miranzai Expedition would not only have come in handy for the second Miranzai Expedition, but would have been of incalculable benefit during the late Tirah campaign. The line could have been laid, as a single line, along the public road nearly the whole way, with shunting or crossing stations at Gumbat and Kohat.

Such a line, save for the despatch of sufficient troops to hold the rail-head, at first would mainly be used for the forward transport of supplies to the front, including all commissariat and ordnance stores, while the troops marched by road; or else a portion of the infantry might go by rail, while the remainder and all the cavalry and guns marched by road.

Subsequently the line could also be used for the transport of reinforcements, and for the return of sick and wounded. The use of the line would therefore be strategical rather than tactical.

Some of the chief points to be noted in the consideration of a scheme for the working of such a line are as follows:—

We will suppose that the permanent-way has been laid more or less similar to that of the Barsi Railway already referred to, because that line has been constructed as a first class line, though on a narrow-gauge, and only such a class of line would be capable of bearing the abnormally heavy traffic that would have to be sustained.

The chief points to be noted are—

(1) The time available for the concentration of the expeditionary force.

(2) The quantity of rolling-stock required, especially the due proportion of locomotives, passenger-carriages, wagons and trucks of various descriptions, which will depend on—

(a) the extent to which the actual equipment in use can be supplemented from other sources;

(b) whether the railway is a single or a double line;

(c) in the case of a single line upon the distances the shunting places are apart. Taking an example,\* from the time of the last Afghan War the number of trains per day on the

Lahore-Multan section (a single line) was only 13 each way, the crossing stations being in some cases 20 miles apart, while on the Lahore-Dehli section, with crossing stations 12 miles apart, the number of trains was 17 each way ;

- (d) on the maximum gradient, for this dominates the haulage power of the available locomotives ;
- (e) on the dimensions and capacity of the stock.

The nearest or most convenient line of similar gauge will have to be indented upon for the extra stock required.

(3) In the case of a double line there is the great advantage that loaded forward trains can use one line, and empty return trains the other.

(4) The interval between trains depends upon—

- (1) the block system, under which no two trains are allowed to be on the same section of the line at the same time ;
- (2) the amount of the rolling-stock ;
- (3) the platform accommodation at both ends of the line.

There is no possible gain in despatching trains more quickly than their consignments can be disposed of at their destinations.

Stations and platforms should never be used as store-houses, but should be kept absolutely clear of all troops, baggage, and stores otherwise than in the operations of entraining and detraining. Nor should trucks or wagons even be loaded until arrangements for their disposal at their destinations have first been made.

(5) At detraining stations especially, there should be ample accommodation as regards platforms and sidings.

A Russian working party\* of 12 officers and 500 men, with the material ready at hand, have been known to construct some six miles of sidings and put in 27 points and crossings in 32 working hours.

It will be generally found best to carry out entraining or detraining operations, if on a large scale, at the sidings in the goods yards, where goods sheds, platforms suited for side and end loading and cranes for lifting heavy weights will be found. End loading is most suitable for vehicles, and this should be borne in mind, when providing goods stock and platforms for a military railway.

(6) Sheds for stores and supplies at the advanced dépôt should be constructed, also hospital accommodation ; and

(7) A water-supply for the troops, cattle and engines must be provided, and also stores of fuel.

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\* " Staff Duties " (Clarke).

As soon as the line, or a portion of it is ready for traffic, the time-table is issued, upon which all orders for transport are based.

From the first inception of the railway scheme, the defence of the railway, where such would be necessary, is obviously of primary importance.

Defence of railway.

The laying of the road, within striking distance of an enemy, will have to be specially protected, and all stations, bridges, tunnels, etc., guarded, in fact these should all be regularly fortified. Intermediate stretches of the line should be patrolled and picquetted, small towers being placed at suitable intervals for the accommodation of the troops so employed, and also for that of way (or repair) gangs of labourers.

Small movable columns would be posted at specially selected points. By night picquets and *chippans* should be systematically worked.

The troops for these purposes would be furnished by the troops allotted to the line of communication.

The railway should be made a terror to all the country round; reprisals and the punishment of offences committed against the line, should be rigorously enforced. During the Waziri Expedition of 1894-95, a Prussian Staff Captain accompanied General Lockhart's force in its march up the Tochi Valley, and equipped though the force was in the most efficient and workmanlike manner possible, the one subject that drew his unstinted admiration was the celerity with which the field telegraph line was laid. The laying of the line practically kept pace with the advance of the troops. It mattered not whether the march were 5 miles or 15, by evening telegraphic communication with the base was always secured.

Now, the principal reason why the 2'6" gauge has been selected for certain of our frontier military railways is the celerity with which lines on this gauge can be constructed.

In this connection the mono-rail system is worthy of attention, for it is self-evident that in the single rail the maximum of speed in rapidity of construction is attainable.

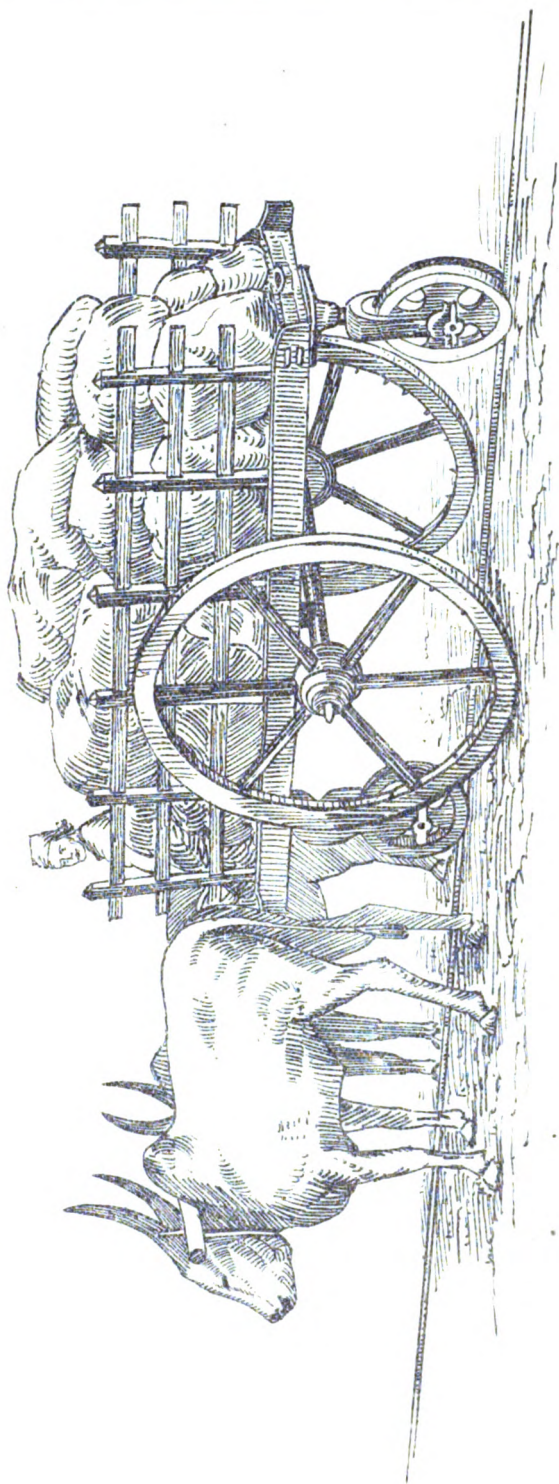
The best example of a mono-rail line that I know of is Addis\*  
 Mono-rail (Addis). single-rail tramway. It is not a new invention, as the trucks or carts were patented by Mr. Addis over thirty years ago.

Little skilled labour would be required for the laying of the line, and being a single-rail all trouble about keeping the rails in gauge is avoided.

The tramway has been practically tested and approved by the Bombay Commissariat Department; a model of the invention can be

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\* Plate III—"Rurki Papers."



Addis's Patent Single-Rail Tramway with Cart on a Curve of 10 feet Radius.  
Load in Cart 3 Tons.





Plate N° V.

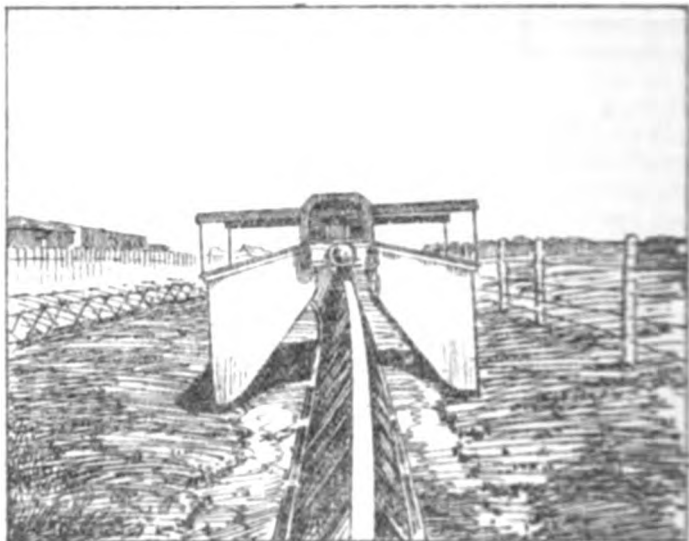
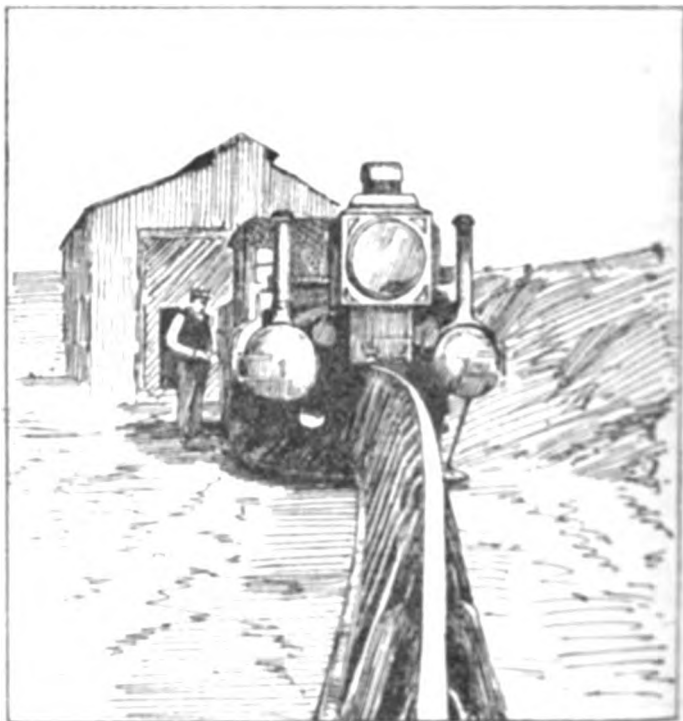


Plate N° IV.



seen at the Bombay Chamber of Commerce. The trams can be worked either by steam or cattle power, and *any description of vehicle* can be used merely by the addition of two or more wheels attached, bicycle-fashion, midway to the under framework of the cart. These wheels are double-flanged, and work on a swivel attached to a screw, so that the body of the cart can be raised or lowered sufficiently to ensure its weight resting on the rail, and its balance only being supported by its own ordinary wheels on the road.

Mr. Addis' patented carts cost from Rs. 150 to Rs. 350 each ; but it should be specially noted that the bicycle wheels can be adjusted to any vehicle whatever.

The rail, ballasted up to the level of the ground, can be laid either on one or both sides of any road without in the least interfering with the ordinary traffic. Provided the road is ready prepared for it, it can be laid with such rapidity that forty men can easily lay one mile per day. The ballasting need only be 18" wide.

It is a very cheap line, with wooden sleepers costing only Rs. 4,250 per mile. One pair of bullocks on this tramway can draw six times as much weight as they otherwise could on the ordinary road. Also single-line stock can accommodate itself to the sharpest curves.

For celerity of execution the laying of such a line as the above would almost vie with the laying of the field telegraph already alluded to.

Mono-rail lines indetical with the above have been adopted on the Continent. Another\* and totally different kind of single-rail railway is well worth noting. It is on the Lartigue system, in other words on the camel-*kajawah* principle, and the line I am about to describe is the only one of its kind in the United Kingdom. It runs from Listowel to Ballybunion in the Kingdom of Kerry : a distance of 10 miles.

The permanent-way consists of a series of A-shaped iron trestles standing about 3' above the ground, and about 3' 3" inches apart. On the top of the trestles is a 27lb. rail. The rolling-stock straddle this rail camel-*kajawah* fashion, the weight of the vehicles being borne on wheels placed, bicycle-fashion, below their centres. To steady the vehicles, and so prevent oscillation and its, in this case, very dangerous possibilities, a very ingenious contrivance has been devised. About 2' from the ground check-rails on each side of the trestles are fixed on which horizontal wheels, placed about 9" from the bottom of the vehicles, run ; these wheels have to bear no weight, and simply check any inclination to oscillation.

This raises the rolling-stock over a foot above the ground level, and so, even over rough unlevelled ground, it is only necessary to level sufficient space for the sleepers which are 3' 3" long.

The trestles are fixed on steel sleepers, or in soft boggy ground on wooden ones. With a little modification the line can be made to form its own bridging across brooks and marshes.

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\* " The Strand Magazine, June 1898. Plates IV & V."



Its advantages are—

- (1) its great safety;
- (2) the line can be quickly and cheaply laid (while the 2' gauge costs £4,000 per mile, this railway costs only £3,000.);
- (3) earthworks are reduced to a minimum;
- (4) it is only necessary to clear the ground for the sleepers to the extent already noted. On the level the engine will draw 240 tons. The rolling-stock is also very unique. Every vehicle is, as it were, a pair. The engine has two boilers, two funnels, etc. The passenger carriages consist of two compartments, the passengers sitting back to back. Goods wagons carry 3 to 4 tons. The speed varies from 15 to 30 miles an hour.

I have referred to both these very different railways because of the necessity for the provision of means for rapid concentration at all vital points on our frontier, and so every system of railway that admits of rapid construction is worth consideration. Kitchener's famous railway (on the 4' 8" gauge) from Korosko to Khartoum was constructed at the rate of 2 miles a day; but this was across a flat country very like the "pat" of the Derajat on our frontier, where the physical difficulties (the question of water excepted) to be overcome were *nil*: the Sirdar too had unlimited labour and money at his command.

Still Lord Salisbury is said to have remarked that Kitchener won by his railway, and by it alone.

Setting aside the question of railways, another and most important matter for consideration is the fact that the ordinary road can be made to supply the place of the railway for rapid traffic, especially in the case of short distances, owing to the growth of auto-mobilism. Consequently the question of our roads is becoming a most important and pressing one, and is a matter which will have to be legislated for.

So far we in England have only adopted the traction engine, or road locomotive, for the transport of special military equipment, and have left the auto-mobile severely alone; but the latter is about to be adopted on a large scale by other governments, notably by the Italian Government for their army.

The best French motor-cars can travel nearly 50 miles an hour, which should be good enough for all military needs. Traction engines of 50 horse-power can draw 50 tons on an ordinary road, and are being used by the military authorities in South Africa, at least a dozen having been sent out there on the outbreak of hostilities.

As yet we have not considered the personnel of the railway. A military railway in connection with, and on the lines of communication of, an Expedi-

Personnel.

**tionary Force**, should preferably be worked by a railway corps which would form a complete military unit in itself, and which, of course, would have to be specially organised and trained for its very special work.

To begin with, such a corps could not be included in the effective fighting portion of the force, nor could it be counted upon even for the defence of the railway itself. Its duties would be absolutely restricted to the actual working of the railway, and so it should be included as a section of the Transport Department.

All ranks would be armed for their own defence, and for this purpose would be regularly trained in the use of their arms, and but little more military training would be necessary in their case.

The corps should be organized and equipped as an actual unit of the regular army, with its full complement of officers, non-commissioned officers and men; but its services should, in peace time, be lent to some of the great railways companies, in order that it might be permanently employed, as far as possible, solely in railway work: as, for instance, in the construction of new lines, or extensions, or branch lines.

Of all the nations of the world England ought to have the very first and best organized military railway service. She certainly understands railways better than any other nation.

The railway employes in Great Britain alone number some 500,000, of whom at least 10,000 belong to the Army Reserve, while there are many more who have completed their reserve service. Here there is no question of want of material, the latter is ample; it is simply a question of organization. The finest railway corps possible could be formed at home by the stroke of a pen.

If we turn to India, as more immediately connected with our subject, I think there will be little doubt that the fiat of Government is all that is necessary, and that the men required will be more than forthcoming from both the British and Native services.

The Madras railways have met the authorities half way in this matter, by undertaking to train Tommy Atkins in railway work. Before proceeding to formulate any scheme for the raising of a railway corps, let us see what our continental neighbours are doing in this respect. We can learn something even from poor Italy. In that country it has been found important, for political and military reasons, to bring the railway officials under military control and discipline.\*

Reservists of the army, so long as they remain in railway service, are exempt from all military drill and training, and are only subjected to military discipline for such periods as may be considered necessary, and which are notified by royal decree.

As long as the ordinary condition of things lasts, the military rank of the railway employes remains in abeyance, and they continue their service with the railway authorities as hitherto, without having any claim as to salary on the military department.

Certain special punishments are prescribed for railway reservists should they fail in their trade contracts.

This action of the Italian Government has attracted the attention of France, and as an experiment the French Government recently subjected one line to military rule for a few days time as a trial step, and as a mobilization test of the railway staff affected. The line chosen was the Marseilles-Toulon-and-Nice line, as it is both strategically important, and a line of a great traffic; its staff was also suspected of being tainted with socialism. For three days in July last the line was placed on a military footing, all employés wore their usual dress, an arm-band only indicating their military standing. All officials, however, over a certain rank, were obliged to wear the *képi*, and the strictly military officials also carried side-arms. The trial appears to have been a satisfactory one.

It has also been proposed to retain all railway employés under military control and discipline for the whole of their railway service, exempting them, however, from all purely military duties.

This is the law in Germany, which also has its regular railway corps as the I Railway Regiment, etc., but these are construction corps.

Now I think that a railway section of the Transport Department might be formed in our service, and that the administration and construction branches should be kept quite distinct and organized into separate corps.

The railway section might thus consist of—

I.—Staff—

- 1 Director-General (R.E.)
- 1 Assistant do. do.
- Traffic Superintendent.
- Locomotive do.
- Ways and Works do.

The civil officials to be given suitable honorary military rank.

II.—Administration companies, including—

(a) Assistant Traffic Manager.

- Station Masters.
- Clerks.
- Telegraph officials.
- Guards.
- Drivers.
- Firemen.
- Signalmen.
- Shunters, etc.

In fact a complete working establishment.

- (b) Engineering or way companies, consisting of—  
     Ways Engineers.  
     Plate-layers.  
     Break-down gangs, complete.
- (c) Locomotive repair companies—  
     Assistant Locomotive Superintendent.  
     Inspectors.  
     Firemen.  
     Examiners of stock.  
     Smiths and carpenters, etc.

These companies would be divided into sections which would be permanently told off for certain railway lines. The only military duties ordinarily to be exacted from the above establishments would be a rare muster for inspection, a little musketry practice as demanded from the Volunteers, and the necessary reports of casualties to check the company muster rolls. In fact the personnel of these companies would simply be registered. The men of each section should be so distributed over the line on which they serve that on emergency the entire section should be available for military purposes, without causing any serious dislocation to the working of the line.

The first time we organized a railway corps as a military unit was in Egypt in 1882.\* It was commanded by an R. E. field officer, and consisted of three special officers and the 8th Company, R. E. It repaired and worked the railway from Ismailia to the front.

Similarly, I think the branch line or section of a frontier railway used in connection with a frontier expedition should be entirely worked by the Military Railway Transport Corps. This would completely eliminate the possibility of friction between civil and military.

III.—The Railway Pioneer Battalions I would have raised, equipped, and organised something similar to our pioneer regiments of the Indian Army, except that—

- (1) they should be officered from the R. E.
- (2) with a due proportion of British N.-C. Os. ;
- (3) and each battalion would have a variable establishment of privates enlisted from the coolie class.

These battalions should be permanently lent to railway companies for construction work, and should be employed, for instance, on work like the recent extensions of the Cooch-Bihar railway.

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\* " Staff Duties " (Clarke).

Permanently employed in this way, these corps should cost Government little but their initial equipment. A small head-quarters would, however, have to be maintained.

The new railway extensions might be worked by these pioneer corps on the Australian "butty-gang" system, which is as follows:— No large contracts are given out, but the work is allotted at certain rates to the "butty-gangs" which may number as many as 60 men each. This system brings more money into the pockets of the men.\*

I don't know what the Indian contractor would have to say on the matter, but I think the system worth noting.

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\* "Light Railways" (Cole).



$E_{\gamma}$ [illegible]

## TACTICAL STUDIES FROM THE AFGHAN WAR (continued).

BY LIEUTENANT-COLONEL A. KEENE, D.S.O., R.A.

AHMED KHEYL.

After the collapse of the tribal combination that invested Kabul December 1879 the malcontent leaders retired to Ghazni, and it was decided that Sir Donald Stewart should lead the Kandahar expedition *via* Ghazni towards Kabul. The necessary preparations for the relief of General Stewart's troops by others from Bombay were accordingly set in motion. By the end of March 1880 Sir Donald Stewart handed over the charge of affairs in Southern Afghanistan to General Primrose and started on his long march to Kabul. After passing Kelat-i-Ghilzai all the villages were found deserted, and supplies were with difficulty obtained for the native troops. On several occasions hostile bodies were seen hovering on the flanks of the column; shots were exchanged on the 16—17th April, and on the 18th a force of 10,000 Afghans were seen by our scouts moving parallel to our column, some 8 miles from our right flank. Warned by these signs Sir Donald moved on the 19th with a strong advance guard, consisting of the 10th Bengal Lancers and A Battery, Royal Horse Artillery, supported by the 19th Punjab Infantry. Then came the main body formed of the second brigade. The baggage came next, and the rear was brought up by the 1st Infantry Brigade with a mountain battery and a regiment of cavalry. The column, when on the march, spread over a distance of 6 miles, and apparently it was anxiety for his baggage which led the General to form so strong a rear guard. Our spies had visited the enemy's camp on the 18th and had brought news that our advance would be opposed. Their information proved correct, for, when the General had marched some 7 miles, the cavalry of the advance guard reported that the enemy were in position 3 miles ahead.

Our troops accordingly closed up. The artillery consisting of one horse, one field, and one heavy battery in column of route on the road, most of the cavalry on the right where the country was fairly open, the infantry on the left flank. Half a squadron of the 19th Bengal Lancers covered the left of the infantry brigade which was in close proximity to a range of low hills. These hills ran parallel to the road for some distance and then took a bend to the east. The road to Ghazni led over the hills where they trended eastward, and it was evident that at this point the enemy were prepared to oppose our onward march. Their standards were seen planted along the ridge on both sides of the road, while their right wing extended for some distance along the high ground on our left, thus flanking our line of advance.

H



*Fight against guns.*

\* 1 Co. 2-60th and 1 Co. 26th P. M. I. were on left of G-4. ; 1 Co. 10th P. M. I. between G-4 and A. B., R. H. A.

Line (Sd.) L. T. BISHOP, Captain,  
Enemy's Dy. Asst. Qr. Mr. Genl., 2nd Brigade

## TACTICAL STUDIES FROM THE AFGHAN WAR (continued).

BY LIEUTENANT-COLONEL A. KEENE, D.S.O., R.A.

AHMED KHEYL.

After the collapse of the tribal combination that invested Kabul in December 1879 the malcontent leaders retired to Ghazni, and it was decided that Sir Donald Stewart should lead the Kandahar garrison *via* Ghazni towards Kabul. The necessary preparations for the relief of General Stewart's troops by others from Bombay were accordingly set in motion. By the end of March 1880 Sir Donald had handed over the charge of affairs in Southern Afghanistan to General Primrose and started on his long march to Kabul. After passing Kelat-i-Ghilzai all the villages were found deserted, and supplies were with difficulty obtained for the native troops. On several occasions hostile bodies were seen hovering on the flanks of the column; shots were exchanged on the 16—17th April, and on 18th a force of 10,000 Afghans were seen by our scouts moving parallel to our column, some 8 miles from our right flank. Warned by these signs Sir Donald moved on the 19th with a strong advance guard, consisting of the 19th Bengal Lancers and A Battery, Royal Horse Artillery, supported by the 19th Punjab Infantry. Then came the main body formed of the second brigade. The baggage came next, and the rear was brought up by the 1st Infantry Brigade with a mountain battery and a regiment of cavalry. The column, when on the march, spread over a distance of 6 miles, and apparently it was anxiety for his baggage which led the General to form so strong a rear guard. Our spies had visited the enemy's camp on the 18th and had brought news that our advance would be opposed. Their information proved correct, for, when the General had marched some 7 miles, the cavalry of the advance guard reported that the enemy were in position 3 miles ahead.

Our troops accordingly closed up. The artillery consisting of one horse, one field, and one heavy battery in column of route on the road, most of the cavalry on the right where the country was fairly open, the infantry on the left flank. Half a squadron of the 19th Bengal Lancers covered the left of the infantry brigade which was in close proximity to a range of low hills. These hills ran parallel to the road for some distance and then took a bend to the east. The road to Ghazni led over the hills where they trended eastward, and it was evident that at this point the enemy were prepared to oppose our onward march. Their standards were seen planted along the ridge on both sides of the road, while their right wing extended for some distance along the high ground on our left, thus flanking our line of advance.

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An urgent message had already been sent to General Barter with the rear brigade asking for half his infantry and two squadrons of his cavalry. The enemy's position was very strong, but immediate arrangements were made to attack him. The horse and field batteries came into action and shelled the ridge in front, while the 59th, 2nd Sikhs, and 3rd Gurkhas deployed to the left facing the enemy's right wing. The 2nd Punjab Cavalry covered our right flank, and one-and-a-half squadrons of the 19th Bengal Lancers were on the left of the infantry. The heavy battery was in action on a knoll to our left rear. The General and his escort took post on a mound behind the 19th Bengal Lancers, and the 19th Punjab Infantry and sapper companies were held in reserve in rear of the left.

Our arrangements were barely completed when the hills were seen to be crowded with Afghans along a front of nearly 2 miles. As the guns opened fire, a commotion was observed in the leading ranks of the enemy. The mullahs were seen haranguing the tribesmen with frantic energy. The tom-toms beat louder and louder and suddenly, as if by magic, a wild stream of men burst from the hill-sides and rushed upon General Stewart's thin line. Three to four thousand Ghazis took part in this attack, the impetuosity and boldness of which has never been equalled even by Muhammadan fanatics. A few were on horseback, but most on foot, yet such was their headlong valour that they crossed the six hundred yards that intervened and were engaged in hand-to-hand conflict with our men almost before the latter had fixed their bayonets. As this wave of Ghazis burst on our front and flanks, a large body of Afghan horse rode along the hills threatening our left and rear. Here two mullahs leading from the hills united in the open at a point close to where the 19th Bengal Lancers were posted on our left. Tearing down these mullahs the enemy's cavalry met in one mass and charged the Lancers before the latter could get up speed to meet them fairly. The Lancers were driven back and dashed into the 19th Punjab Infantry. Ammunition mules stampeded, riderless horses dashed in among the General's escort, and so close did the Ghazis penetrate that the General and his staff drew their swords and prepared for hand-to-hand conflict.

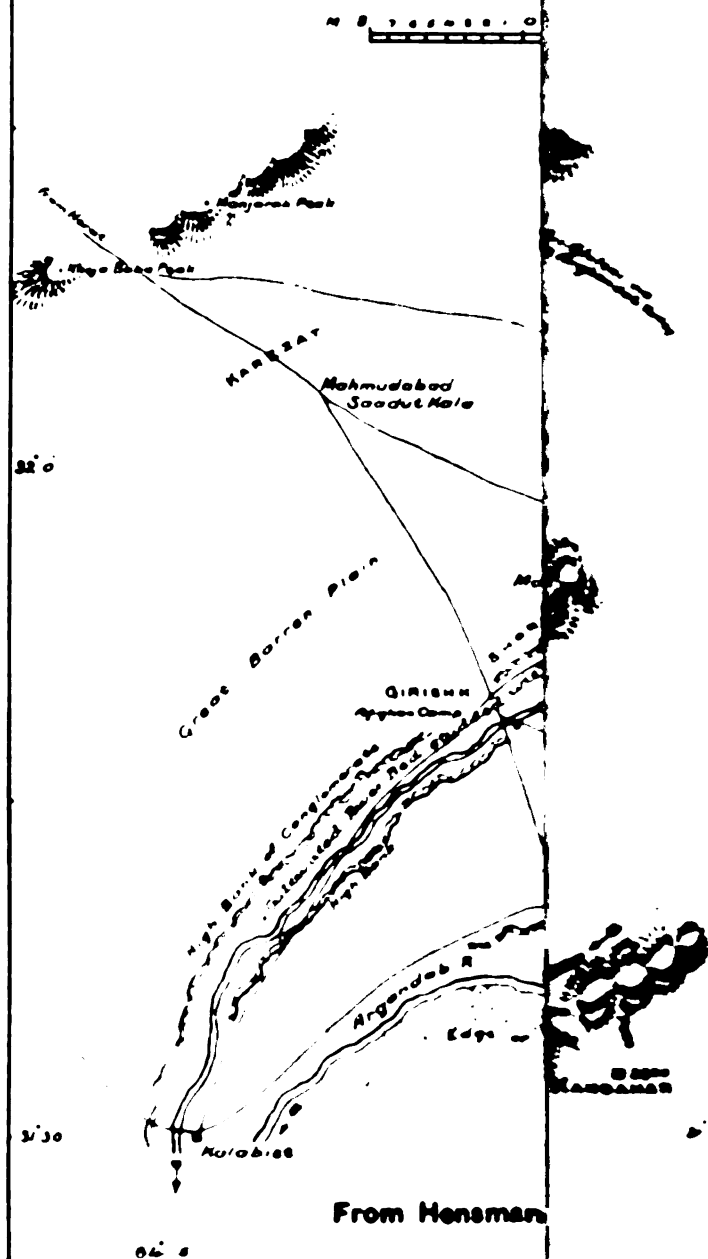
The situation was now most critical. So fierce and sudden was the attack that even the seasoned infantry that composed our thin line were for a moment thrown into confusion. A—B, the battery of Horse Artillery, on our right front was firing case and reversed shrapnel into masses of men, some of whom charged to within thirty yards of the muzzles of the guns. The 59th, misled by an order to throw back their right, actually retired a short distance, and for a few minutes affairs looked desperate. But the steadiness of our troops soon restored the fight. The gunners of A, B and G-4 stood successfully to their pieces, the 59th rallied behind the first cover they reached in their retirement, the 2nd Punjab Cavalry charged again and again into the masses of Ghazis that thronged on our right flank. In the centre the 2nd Sikhs budged not one inch from their original ground, while on the left the Ghazis, after driving in the Lancers, came on Colonel Lyster's regiment. The stubborn little Gurkhas formed in company squares, dogged and unflinching, poured volley after volley into their surging and tumultuous ranks.



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### MAP TO ILLUSTRATE

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On the extreme left thundered the 40-prs. pouring their heavy shells into the dense masses of the enemy. Meanwhile the whole of our reserves had been thrown into the fight. Half a battalion of the 19th Punjab Infantry and the Sapper companies strengthened our left. The other wing of the 19th and two companies of the General's own escort were thrust in between the 59th and the Horse Artillery. As soon as the first rush was stemmed, deadly volleys from our breech-loaders mowed down the brave Ghazis in hundreds. The Afghans on the hill-sides watching the fray made no attempt to support the superb fighting of their first line. The fire of fanaticism was quenched, and in five and forty minutes from the time of the first rush the rout of the enemy was complete. One thousand dead bodies of Ghazis lay on the field and good weapons in the hands of seasoned and disciplined troops had triumphed over the finest burst of fanatical valour that has ever been seen.

The cavalry were eager to pursue, but were recalled owing to the General's anxiety for the long line of baggage and stores that had to be protected. Our losses amounted to 17 killed and 126 wounded. The wounds were nearly all cuts of sword or knife, the result of hand-to-hand fighting.

The study of this battle presents many difficulties to the theorist. As the story is told in despatches and in various published accounts, we cannot understand why a flank march was made past the enemy's right wing, or why, when he had sent for two squadrons and some infantry from his rear brigade, the General did not wait for them to come up before he attacked. Looking at the plan on paper, one wonders why, with a Gurkha regiment at hand, the attack was not made along the low hills on our left. These hills are spoken of as low and were presumably easy of access. Still the fact remains that it is difficult to see how a heavier loss could have been inflicted on the enemy, or a more decisive victory gained. The recall of the cavalry from the pursuit must, however, in the light of after-events be looked on as a mistake. After defeat an Afghan army collapses utterly as was seen from this battle, and again after that of Kandahar. Even after a victory like Maiwand, Ayab Khan could not get his army together for a pursuit.

#### MAIWAND.

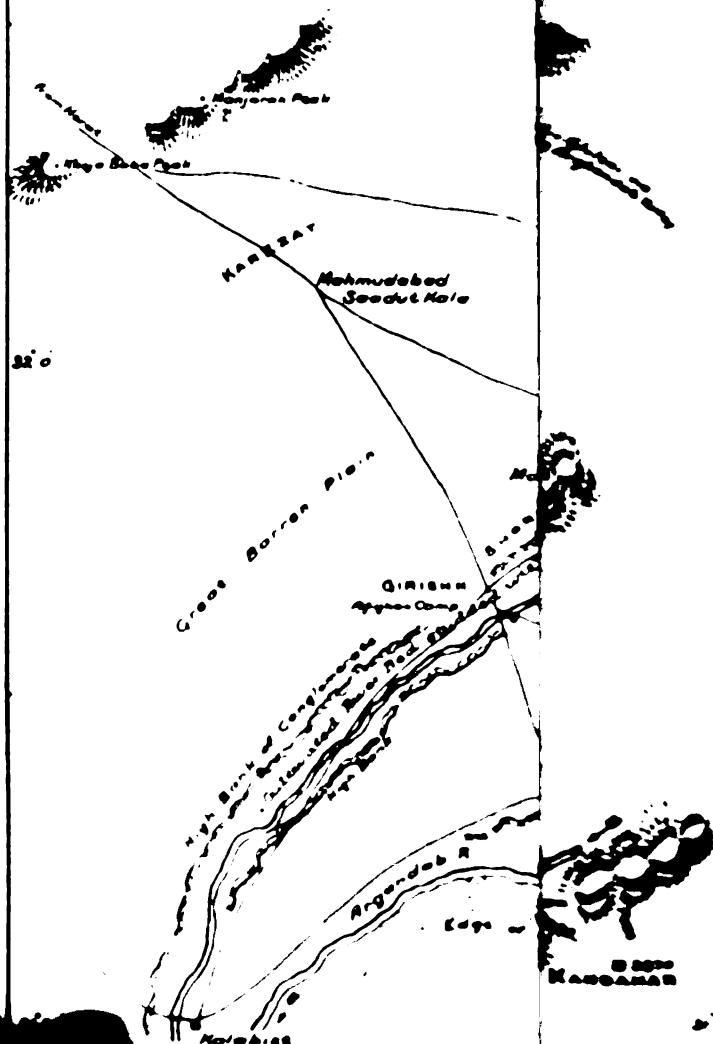
General Stewart handed over the affairs of Southern Afghanistan and left Kandahar for Kabul at the end of March 1880. His troops were replaced by others, chiefly from the Bombay side, and by the 11th April General Primrose was installed at Kandahar. Within five days his troubles began. Major Waudby, Road Commandant, who had charge of the line between Kandahar and the Kojak, arrived on the 16th April at the small post of Dabrai, about 25 miles from Chaman. This officer had but five native soldiers with him, for the posts were held by tribal levies. Soon after his arrival Waudby got a message from a friendly Achakzai chief that he would be attacked that night. On receiving this warning he looked round his small post. Its defences consisted merely of a mud wall, 4½ feet high, surrounded by a narrow ditch. His orderlies urged him to escape while there was yet

66° 15'

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From Hensman

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time, but this he declined to do, as it meant leaving the wretched commissariat babu and his assistants to their fate should the Afghans attack. He therefore arranged a breast-work of grainbags at the gateway with a loophole to fire through and resolved to die hard. At 8 that evening he posted sentries and lay down for a short rest. At 10 P.M. he rose and sent out two men, a duffadar of the Guide Horse and his Afghan interpreter to reconnoitre. They had not gone far when the enemy was seen approaching. The duffadar raised a cry of warning and started to ride back; but as he turned, he was cut down by his treacherous companion. The Afghans, some 300 in number, now rushed at the little post, but the small garrison, reserving their fire, gave the assailants a very warm reception. Time after time they came on, but Waudby was a deadly shot, and, standing in the gateway behind his barricade, laid low one man after another. For hours the fierce struggle lasted till at length the enemy climbing over the wall took the brave defenders in rear. His ammunition was exhausted, but seizing a horse the gallant Waudby died fighting to the last.

A party of our cavalry coming up the next morning found among the ruins of the burning fort the brave officer's body and stretched across it, slashed with sword cuts, but still alive, his faithful bull-dog Boxer. But Waudby's was not the only body they found: opposite the gateway lay no less than 30 Afghan corpses.

The Afghans, who had intended to sack all our posts between Chaman and Kandahar, were so disheartened at the result of their attack on Dabrai that they dispersed to their homes.

But this was only the beginning of trouble. On the 17th April news reached General Primrose that the Kabuli regiments quartered at Herat were urging Ayub Khan, one of the late Amir's sons, to march on Kandahar. On May 24th the Afghan Governor, whom we had set up in Kandahar, confirmed this news. Subsequently it transpired that on 10th June Ayub Khan left Herat with 7,500 troops. These, however, were merely the nucleus of his force, for he expected to and did receive accessions of large numbers of fanatical tribesmen *en route*. The Wali had meanwhile moved out to Girishk with his troops, and on 21st June he wrote to Colonel St. John, Chief Political Officer, to say that he had now definite news of Ayub's march from Herat, and he earnestly requested the support of a British brigade from Kandahar.

On 5th July a force under General Burrows marched for the Helmund. It was composed as follows:—

British Infantry	...	...	...	...	520
Native "	...	...	...	...	1,200
" Cavalry	...	...	...	...	500
Bombay Sappers	...	...	...	...	45

and E Battery, Royal Horse Artillery, 6 guns.

All this time Ayub was steadily advancing towards the Helmund river, but hordes of Ghazis and cavalry formed a cordon through which our spies could not pass, and we had very little information as to his movements. This steady yet furtive advance had a very bad

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effect on the troops of the Wali who were supposed to be our allies, and on 14th July, a few days after Burrows reached the Helmund, they deserted to the enemy, taking with them four smooth-bore guns that we had presented to their chief. Our cavalry and horse artillery at once went in pursuit and, coming up with the mutineers, scattered them and re-captured the guns.

General Burrows now found himself forced to retire. The line of the Helmund was untenable. In the dry hot weather the river was fordable everywhere and offered no obstacle to the enemy, while in rear of us stretched a waterless desert, 25 miles in width. On the night of the 15th General Burrows therefore made a forced march across this desert, and on the 17th he reached Kushk-i-Nakhud. This position had many advantages. It covered the roads leading from the Helmund to Kandahar and menaced Ayub's flank should he march north on Ghazni, while supplies were easily attainable. Meanwhile Ayub came nearer and nearer, and on the 20th his main body was on the Helmund.

Our troops at this time were in excellent spirits, supplies came in freely, the camp was entrenched, and the guns that we had re-captured from the mutineers were manned by men of the 66th and formed into a battery. Our cavalry patrols went out daily, and on the 23rd they first gained touch with the enemy. The country round the camp is thus described: "For miles around all was more or less desert. North of us, 15 or 16 miles away, rise suddenly from the strong plains the Shah Maksud, Garmab Hills. From these precipitous ranges the desert slopes towards the Argandab river, but the apparent level of the ground is intersected with water-courses, mostly dry at this season, while numerous low swells in the ground intercept the view. About 4 miles north of our camp a long low ridge stretched east and west, shutting out all view in that direction. Along that ridge therefore we had to keep two cavalry patrols. South of our camp was a gentle rise of sand-hills. There we had another cavalry patrol who, if it had not always been too hazy, might almost have seen as far as the Argandab river.

A cavalry patrol of ours that had gone to Maiwand on the 25th brought in some most important information to our General. This was to the effect that Ayub was expected at Sangbur on the 26th and at Maiwand on the 27th. Unfortunately, instead of acting on this, General Burrows allowed himself next day to be persuaded by the Chief Political Officer that we could still forestall Ayub and his main body by a day, if we reached Maiwand on the 27th. On the 26th orders were issued accordingly, and early the next morning our force paraded for a move on Maiwand. But the necessity of loading up a very large quantity of reserve supplies delayed the start, and our troops were not actually in motion till 6-30 A.M. The cavalry were astir before day-break, and Lieutenant Geoghegan placed a screen of videttes across the Kushk-i-Nakhud river, while a piquet watched from the hills 3 miles north of camp. One squadron and Lieutenant MacLaine's guns of the Royal Horse Artillery acted as an advance guard. Then came two squadrons of the 3rd Bombay Cavalry and two more guns. The

infantry marched in line of columns across the open plain. The 66th an Jacob's Rifles on the right, the sappers and S.—B. guns on the road, and the 1st Bombay Grenadiers on the left. The rear guard was composed of a squadron of the 3rd Scinde Horse and the remaining two guns of the Royal Horse Artillery with flanking parties to right and left. About 8-30 A.M. Lieutenant Geoghegan, who was with the most advanced body of cavalry, reported that he could see the enemy's horsemen moving in small parties towards Maiwand. At 10 A.M. the column halted, and during this halt a spy arrived breathless and exhausted. He had been in Ayub's camp at Sangbur the night before, had returned to report at Kushk-i-Nakhud, and finding us gone had hurried after us. He brought the startling information that Ayub's troops were occupying Maiwand in force. At the same time Geoghegan from the front and A. M. Monteith from the left flank both reported the enemy as being visible on the left front of the column.

General Burrows and his staff went to the small hill where Geoghegan was, and through the thick haze of heat and dust they could make out large bodies of Afghans on the plain between Mundabad and Garmab. This, coupled with the information of the spy, made it clear that the enemy were crossing our front, had occupied Maiwand, and that, if left alone, they would seize the Maiwand Pass and with it the road to Kandahar.

General Burrows had no hesitation in determining to attack at once, and, confident of success, our troops advanced to the battle.

In front of us lay the village of Mundabad, and this Blackwood was ordered to clear. For this purpose he called up Fowell's two guns, and, hearing from the advanced cavalry that the village was unoccupied, he passed through it with Fowell's guns, leaving MacLaine waiting for orders. Seeing his enemy before him, this impetuous young officer apparently on his own initiative crossed the nullah boldly to the front and opened fire on the Afghan cavalry. His position was considered too far advanced, and Major Hogge, spurring after him, brought orders to retire which were reluctantly obeyed.

Meanwhile the rest of the battery and the smooth-bore guns had arrived and came into action, protected by the cavalry. So far all was well. General Burrows had acted right in advancing to the attack, but now came the fatal error. The infantry, who had come up, were ordered to lie down and the advance ceased. As soon as the Afghans saw that our forward movement was stopped, they gathered courage. Their regular regiments wheeled to their right and their guns, commencing from near the spot where MacLaine's guns had been, were brought into action in succession from the right. Swarms of irregular cavalry in loose open order circled round our left, threatening our baggage, while Ghazis in thousands advanced to a nullah, 700 yards from our right front.

Our infantry now moved up into line with the guns, and from this time forward our lines stood for hours under the fire of the enemy's artillery.

In order to thoroughly understand what followed, we must now study the exact position of our troops. On the right stood the 66th, then a wing of Jacob's Rifles, then two guns, Royal Horse Artillery

next to them two companies, Jacob's Rifles, then two more guns of E—B, next the sapper company, then MacLaine's guns, then came the Grenadiers, on their left the smooth-bore guns and on the extreme left two more companies of Jacob's Rifles. The cavalry kept moving about, keeping in check the Afghan horse that threatened our left rear and the baggage. The action now became on our part a defensive one, and no more unfavourable position for such tactics could have been found, for both flanks were in the air, 700 yards to our front was a nullah affording cover to the assailants, while our whole line was to a certain extent enfiladed by Ayub's guns.

At first our chief losses occurred among the horses of the cavalry and artillery. Our infantry were lying down, and firing very steadily, with their breech-loaders inflicted heavy loss on the dense masses of the enemy. But slowly and surely the foe came on, the regular regiments on their right, while crowds of Ghazis planted their standards opposite to the front of the 66th, and others crept down the dry ravine towards the village of Khik. The action began soon after eleven; two hours afterwards the ammunition of the smooth-bore guns was all expended; and as there were no wagons to bring up a fresh supply, Captain Sade, who commanded them, sent them to the rear with orders to replace ammunition and return as soon as possible. This was the second mistake, for the withdrawal of the guns had a most depressing effect on the infantry on our left, who, being more exposed than the others, had already begun to suffer severe losses. It was now nearly 2 P.M. Our troops were as yet standing firm, though the enemy were creeping round both flanks. All our infantry was hotly engaged, and the enemy was more than once checked and driven back. But their great numbers enabled them still to press on. Soon after two the fire of the Afghan artillery began to slacken. At first General Burrows hoped that their ammunition was running short, but it soon appeared that the cessation of fire was merely to admit of a direct attack on our centre. Led by the Ghazis our foes came rapidly on, but the case shot from our guns swept the ground in front. The 66th had not as yet suffered much and were firing steadily; if our line stood firm, there was yet hope. But the two companies on our left had lost all their officers killed or wounded; their nerves were too shaken to await the charge of the Ghazis, panic seized them, and they suddenly gave way.

The Bombay Grenadiers rose to their feet and attempted to form square, but in the haste and confusion the effort failed and the Ghazis were on them. Exhausted by the long struggle, feeble from want of food, parched with thirst, the sepoys surged a helpless crowd towards our right. Bayonets were not even fixed and the Ghazis were seen actually in the ranks of the Grenadiers pulling the men out and hacking them with their swords. The right wing of Jacob's Rifles now caught the panic and crowded on the left and rear of the 66th. The end was near. The 66th still kept their line, but pressed by the Ghazis in front, and our own sepoys on the left, retired slowly towards the right, still keeping their cohesion and firing steadily into the mob of Ghazis.



The last hope lay in a cavalry charge. Galloping up to General Nuttall, who commanded the cavalry, General Burrows urged him to make the desperate attempt. Placing himself in front, Nuttall hurriedly formed the line and gave the order to charge. The troopers charged indeed, but, instead of going straight to their front, they inclined to the right and fell on the Ghazis who were attacking the Grenadiers; but then seeing the infantry all retreating and the guns gone, the cavalry wheeled about and retired also.

Much has been said of this failure, but the troopers, who were called upon to make this charge, had been under fire for four hours, unable to retaliate while suffering heavy loss. They had seen the guns and infantry retire, they had barely space to get up speed, and their course towards the enemy was impeded and broken by our flying sepoys. Even amidst this panic the horse artillery remained firm. Slade, who now commanded, seeing the guns in danger, gave the order to retire, but MacLaine, waiting to fire one more round of case when the enemy were only 20 yards from the muzzles of his guns, lost them, and with difficulty saved his limbers. As soon as the other guns were free from immediate danger, Slade halted and re-filled his limbers from the wagons and, retiring slowly, crossed the nullah in rear and again came into action. The handful of Bombay Sappers under Lieutenant Henn fought desperately to save the guns and were cut up almost to a man where they stood.

The 66th meanwhile had fallen slowly back on the village of Kilik where they turned and faced their pursuers. The whole brunt of the pursuit fell on them and some of the Grenadiers, and the most desperate fighting ensued, till a walled enclosure was reached. Here the remnant of the 66th, some hundred men in all, rallied round their colours. Surrounded on all sides by countless numbers, they fought on till only eleven men remained. Then these eleven made a desperate charge and died fighting bravely to the last man.

They did not die in vain, for after this there was practically no pursuit. The rest of our troops retired by the road they had come through Mundabad and then on Kushk-i-Nakhud. But though there was no pursuit, our troops were so demoralised that all order was lost. The artillery alone preserved their formation and morale. Their guns and limbers were crowded with wounded men and formed some sort of rallying point. The conduct of the battery is all the more creditable when we remember that Blackwood, the Major, and Lieutenant Osborne were killed and Fowell was wounded. MacLaine went off at one of the halts in search of water and was taken prisoner, so that eventually Slade, the Captain, was the only officer left.

All through the long night the weary, thirsty men struggled on, halting here and there for water, fired on from the villages that they passed in their disordered flight, and again and again hurried on by scares of pursuit. It was not till after seven the next morning that they reached the Argandab river, and met there a few sabres of the Poona Horse who had been sent out from Kandahar and who now covered the retreat. Of the 2,500 men who had marched from Kushk-i-Nakhud the morning of the 27th, over 1,000 perished in the battle and retreat.

The great lesson to be learnt from this disaster is that, when an Asiatic enemy is met, you must attack him boldly. If you stand still he gathers courage and eventually mobs you by sheer force of numbers.

Again we come across the old fault of not reconnoitring the ground thoroughly before deciding on a plan of battle. Nothing could have been more unfavourable to us than the position of the nullah which enabled the Ghazis to collect within 700 yards of our line. The splitting up of the guns was also a bad fault. Had the battery of Royal Horse Artillery been kept together and the fire of its six guns concentrated on each battery of the Afghan artillery as it came up, it should have shattered each in succession.

But if there was bad management, there was also bad luck. The column was delayed at the start and hampered throughout by a long train of baggage and stores. The soldiers had to contend against intense heat and want of water, and to fight a long and trying battle without food at the end of a march.

A serious defect in our system of making war is also revealed by the fact that Colonel St. John from his high position as Chief Political Officer was able to influence the General too much. *Inter arma cedant togæ*. The civil authorities should keep in the back ground while a state of war exists.

#### KANDAHAR.

The disaster of Maiwand carried dismay far and wide. The Kandahar garrison hastily evacuated its cantonments and took shelter within the walled city, while the fanatical population rose on all sides. The troops in the small posts on the line between the Kojak and Kandahar were at once withdrawn, some to Chaman and some to Kandahar itself, and soon the latter city was closely invested. The Government of India made the most strenuous efforts to retrieve the disaster. At Kabul negotiations had just been concluded for handing over the government to Abdul Rahman and our war worn troops were eagerly looking forward to their homeward march, but our power and our prestige had to be restored, and for this purpose Sir Donald Stewart allowed General Roberts to select from the troops at Kabul 10,000 of the very best men. Good transport too was available, and on 9th August this picked force started on the weary march of 300 miles to Kandahar. And if they went not gladly, yet they marched with dogged resolution to relieve their comrades in distress, proud of their chief and of the great trust imposed on them.

On the Quetta side too every nerve was strained, but for this column, the troops had to be collected from all parts of India and railed across the burning plains of Scinde and the Punjab to the mouth of the Bolan pass. Here there was little transport available and what there was, was poor. However by one means or another reinforcements were pushed up to Quetta and the Peshin valley. But while these came straggling up by dribblets the well-equipped veterans of Roberts' force, with good mule transport, had been striding along at the rate of fifteen miles a day. Fortunately for them, the tribesmen round had been thoroughly cowed by the severe defeat they had suffered at Ahmed Khel and no resistance was offered. The crops too were up and there was a good supply of fodder for our mules and horses.

Roberts' force marched from Kabul on the 9th and reached Kilat-i-Ghilzai on the 23rd. Here they found friends, for our little garrison had stoutly maintained itself at this post. In fifteen days our troops had covered 225 miles, and General Roberts, learning that Kandahar was well provisioned, ordered a day's halt. An officer, who accompanied the column, thus describes the march:

"After leaving the fertile Maidan valley, we said good-bye to trees and verdure of every kind. Time seemed to resolve itself into an endless, scorching Indian day. Man and beast struggled on as if driven by an implacable fate. Under foot was stone and sand and choking dust, on either hand a barren mountain wall neither closing in nor opening out. Above and below and all around a fierce midday glare that seemed to dry the very marrow in your bones and made your soul faint within you."

The force was composed of one regiment of British and three of Native cavalry, three batteries of mountain artillery and three brigades of infantry consisting chiefly of Sikhs and Gurkhas with a British battalion in each brigade. A good deal of difficulty was experienced in getting a uniform rate of marching. When the long-legged Sikhs or Highlanders led, the sturdy little Gurkhas panted and toiled behind them; when the Gurkhas led, the pace was deadly slow to the Sikhs and Europeans. The march, indeed, was a trying one for all, but especially for the rear-guard which began its day's work by moving out in skirmishing order to pick up the wretched followers who wearied to death, would refuse to move, and begged to be allowed to lie still. But straggling meant death at the hands of the treacherous Afghans that prowled around, and the followers had to be driven remorselessly forward. One thing, however, the troops had in their favour. The commissariat had thoroughly learnt their work, and there was hardly a day on which the Britisher did not receive his fresh baked bread, nor was one instance brought to light in which either soldier or follower failed to receive his ration.

Refreshed by their rest at Kilat-i-Ghilzai, the relieving column marched again on 25th August. Next day they heard that Ayub, warned of their approach, had raised the siege of Kandahar and retired to a position on the Argandab river. On the 27th the cavalry made a double march of thirty-four miles to Robat, where they established heliographic communication with the Kandahar garrison. General Roberts arrived the next morning, and, learning from two officers who had ridden out from Kandahar that Ayub was prepared to make a stand, he decided to move on to Kandahar by short marches, so as to bring his men fresh into action. On the 29th a letter was received from General Phayre, who commanded the relieving column from the Quetta side, to say that he hoped to reach Kandahar by 8th of September.

It was now obvious that General Roberts could not wait for the co-operation of the Quetta column, and he resolved to carry out the relief of Kandahar alone. On the morning of the 31st he reached the city and pitched his camp outside it facing west, his right resting on the cantonments and the left on old Kandahar. He thus covered the city, secured a good supply of water, and was within striking distance

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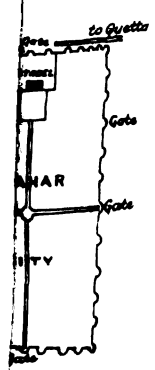
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NOTE.  
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of Ayub. A very short examination of the Afghan position showed our experienced general that a frontal attack on the Baba Wali Kotal, which led direct to Ayub's camp, would be attended by very heavy loss; he therefore determined to repeat the tactics that had won him the battles of the Peiwar and of Charasia, that is, to leave a force to threaten the enemy's position in front, make a wide turning movement round the Pir Paimal ridge and to threaten the enemy's line of retreat. Having sketched out his plan of action, the general sent a reconnaissance in force to make the Afghans reveal their dispositions and strength. The 3rd Bengal Cavalry, 15th Sikhs and two guns were ordered on this duty. The guns and infantry moved to high ground near the village of Gundigan, while the cavalry trotting forward came at last on the village of Pir Paimal, which they found strongly entrenched. Having drawn the enemy's fire and studied their position, the cavalry fell back and the infantry and guns were ordered to retire within our line of picquets. Immediately the retirement began the enemy pressed forward, but the Gurkhas, who were sent out from camp, skilfully covered the withdrawal and by nightfall our troops were snug in camp, while the object of the reconnaissance had been fully maintained.

At daybreak on 1st September our troops stood to their arms, but they were dismissed at six o'clock and a deceitful calm fell upon the camp. It was not till after an early breakfast that the decision to strike at once and to strike hard was made known. Tents were struck and baggage and transport animals were packed in a large garden, where the general had his head-quarters. Then the 1st and 2nd brigades were assembled under cover of Karez hill and the dusky columns stood ready waiting to dash forward at the word of command.

The plan of action was a simple one. On our extreme left, General Baker with the second brigade was to move on the village of Gandigan, keeping touch with the first brigade under General Macpherson. This latter had as its objective the village of Gundi Mulla Sahib Dad, while the third brigade under Macgregor was to act in reserve. The line that had been held by our picquets during the night was taken over by troops from the Kandahar garrison; part of the Bombay brigade with all their cavalry remained in the open plain menacing Baba Wali Kotal and preventing a counter-attack from that direction. The cavalry that had come from Kabul was directed to move on Gundigan, and the first intention was for it to move thence on the Argandab river and threaten the rear of Ayub's camp. But this had to be modified, for the enemy were too strong in this direction and the cavalry had to make a much longer detour.

C. 2 Field Battery and 6·8 mountain were held in readiness under cover of Karez hill. At 9·30 the battle began, two guns of C. 2 at that moment opening fire from the right of Karez hill. Both batteries now began to shell the village of Gundi Mulla Sahib Dad, driving the defenders into the shelter of their underground chambers, and the village was soon carried in the most dashing style by the 92nd Highlanders and the 2nd Gurkhas, the 23rd Pioneers and 24th Punjabis moving up in close support. The enemy retired slowly and

sullenly, some of the Ghazis remaining to the last to receive a bayonet charge of the 92nd.

Meanwhile the second brigade under General Baker was pushing through the lanes and walled enclosures that lay in their line of attack. The enemy, well protected by mud walls which they had carefully loopholed, fought bravely, but the 92nd Highlanders and 2nd Sikhs bore down all resistance. The order was, when once engaged, to keep moving, and only one check occurred. Captain Frome's company of the 92nd resting for a moment in a dry watercourse, came under a terrible fire from a loopholed wall, which the 2nd Sikhs were trying to turn on the right. The captain and several men fell and at this moment the Colonel, Brownlow, came up. He ordered a rush forward to be made, but as he did so he too fell mortally wounded. Major Stockwell, the second-in-command, now hurried up and, forming the men under a protecting elbow of the channel, made a rush for the wall. Once under the loopholes the men were safe, the defenders began to waver and the Highlanders placing the muzzles of their rifles through the loopholes from outside soon cleared the enclosure. The right wing of the 92nd and the 2nd Sikhs emerged from the densest part of the gardens well to the right of Gundigan village. No sooner did the enemy see them in the open than they attempted to rush them. Some of the Ghazis actually charged into the ranks of the 2nd Sikhs, but could make no impression on this, one of the staunchest regiments of Ahmed Kheyl.

The left wing of the 92nd and the 5th Gurkhas had by this time cleared the village of Gundigan. The 92nd and the 2nd Gurkhas had come into line with Baker's brigade and the moment had arrived for the final rush round the Pir Paimal Ridge. But though the ridge was turned, the Afghans could still show a front. This new position faced south pivoting on the Baba Wali Kotal as its left, in front ran a deep water cut, 12 feet broad, and with banks two to three feet high. The banks were ingeniously loopholed and the position altogether a formidable one. The village of Pir Paimal was captured by a rush, but then Major White of the 92nd found himself confronted by thousands of men who seemed determined to fight hard. Whenever our troops halted and commenced volley firing, the enemy surged forward and began to skirmish back to the places whence they had been driven. At the same time the Afghans turning round the guns on the Baba Wali Kotal poured in a heavy fire.

With that quick eye for battle that had served him so well at Charasia, Major White saw it was no time for standing still. The enemy had turned water into one of the irrigation channels to check our advance, but water was just what our men wanted under that scorching sun. Hastily moistening their parched lips, the 92nd dashed forward at their leader's call for "one more charge to close the business." Supported by the fire of the screw guns and well backed by some of the 2nd Gurkhas and 23rd Pioneers, the 92nd soon drove the enemy from their entrenchments at the point of the bayonet. Major White was the first to reach the guns, closely followed by a Gurkha sepoy, who snatching off his cap rammed it down one of the

guns, proclaiming that he had taken it in the name of the Prince of Wales' Own Gurkhas.

The enemy were now completely routed. General Ross halted his men to replenish ammunition, and then pushing on for about half a mile, the gallant soldiers who had undergone the fatigues of the long march from Kabul, were rewarded for all their toils. Before them gleaming white in the sun, stood the tents of Ayub's enormous camp, while no less than thirty-two pieces of ordnance, including the two horse artillery guns lost at Maiwand, fell into their hands. The cavalry making a long turning movement by Kokeran attempted to cut in on the enemy's line of retreat, but they were thrown out partly by the distance they had to go and partly by the rapidity with which our gallant infantry routed the foe. Then again close in rear of the Afghan position ran the Argandab river, its banks dotted with orchards and walled villages, and the beaten enemy running into these, threw off their uniforms if they had any and concealing their weapons, appeared in the guise of harmless rustics.

The joy of the victory was marred by the discovery of the dead body of poor Maclaine, the Horse Artillery officer who had been a prisoner in the hands of Ayub Khan since the retreat from Maiwand. Before they took to flight his ruffianly guards had cut the unfortunate officer's throat: there the corpse lay forty yards from the tent of the Afghan leader who had fled early in the day. But he could have made arrangements for his captive's safety and must bear the blame of his murder.

Our losses amounted to 40 killed and 210 wounded. The Afghans suffered heavily, for no less than six hundred bodies were buried by us between Kandahar and Pir Paimal village.

In this battle we see again generalship of a high order. The country near Kandahar was of course well known to us, but on the very day of his arrival, General Roberts made a strong reconnaissance and learnt all he could about the enemy in the few hours at his disposal. No time was lost in grappling with the foe whose courage might well have cooled in face of the strong increase in our forces.

Again as at the Paiwar and as at Charassia we see the wary commander refusing to attack directly the strong position prepared and held by his enemy, we see a feint only made against the impregnable Baba Wali Kotal, while a wide turning movement drives the foe from his steep and rugged hills.

If we analyse these battles, what do we learn about our enemies? This point seems to stand out clearly, that the tribesman worked up to fanatical excitement by his mullahs is a much more formidable foe than the Afghan regular soldier. At Ali Masjid, the Paiwar Kotal and Charasia strong positions were evacuated by the Afghan regulars with slight loss to themselves and at trivial cost of life to us.

On the other hand, the onfall of the Ghazis at Ahmed Khel staggered for a moment the seasoned veterans that stood in General Stewart's line. It was the Ghazis who led the rush that swept away our men at Maiwand where the Herati regulars had more than once thought of flight; it was the wild tribesmen that penned Roberts'



superb troops within the walls of Sherpur, and finally it was the Ghazis who so stubbornly resisted in the gardens and villages between Kandahar and Pir Paimal.

Drill and discipline curb individual action and clog initiative; when men are banded in regiments, on the officers falls the onus of teaching them what to do and leading them on to do it. Here it was that the Afghan regular army failed.

When we have studied this arduous campaign, there remains in the mind's eye a picture of our soldiers, British and native, as men strenuous to bear the fatigues of marching, hardy to endure "the summer's scorching heat and winter's cold," bold and resolute in action, kindly and honest in all their dealings with a wild and savage foe.

The battle of Kandahar is a *finale* worthy of our renown. By the skill of our general and the bravery of his troops the disaster of Maiwand was retrieved and the curtain goes down on a scene of brilliant victory for our arms.

*Note.*

In compiling the above the following authorities have been freely used :—

Official accounts.

Hensman's "Afghan War."

Younghusband's "Indian Frontier Warfare."

Robertson's "Three Campaigns; Kabul, Kurram and Kandahar."





## WELLESLEY'S CAMPAIGN IN THE DECCAN.

BY CAPTAIN R. G. BURTON, 1ST INFANTRY, HYDERABAD CONTINGENT.

The conditions of war have so far altered in our time that it may at first sight be considered that nothing is to be learnt from the campaigns of the early years of the century, to which a merely historical interest may perhaps be ascribed. But in order to combat such an erroneous idea it is sufficient to observe that certain strategical principles governing the conduct of war are immutable, and have existed through all time, as, for instance, that of the application of force at the decisive point and moment. Napoleon so far recognised this constant nature of fundamental principles that he ascribed a great part of his success in war to a study of ancient history. From the campaigns of Alexander and Cæsar he derived much of his incomparable strategy. Hannibal preceded him in the passage of the Alps, and the foundations of the victories of Austerlitz and Jena were laid at Issus and Pharsalus. It will thus be understood that such events do not possess a merely academic interest, but that valuable lessons are to be drawn from a study of the military history of other times than our own.

It is in fact from the history of the world that those examples may be taken which will best serve as a guide to the conduct of both military and political affairs. It is only by a study of the happenings of the past that the mind can be fitly furnished with principles for the management of great enterprises, and for a clear consideration of the requirements of war and politics; as Thucydides well understood when he dedicated his history of the Peloponnesian War "to those who desire to have a true view of what has happened, and of the like or similar things which, in accordance with human nature, will probably thereafter happen."

In the history of the progress of the British Empire the story of the conquest of India possesses perhaps a greater attraction for us than most other narratives, abounding as it does in incidents of glory and romance, especially those pages which are illuminated by the genius of Wellington, who left his great name and example as an imperishable monument, exciting others to like deeds of glory, and serving at once to adorn, defend, and perpetuate the existence of our country among the ruling nations of the earth.

At the commencement of the present century the aspect of affairs in India, from a political point of view, presented a complex problem. The Moghal Empire had tottered to its fall, and upon its ruins a new power, that of the Maratha confederacy, had arisen. The British, represented by the East India Company, had already advanced some distance upon the path towards the fulfilment of that great destiny

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## WELLESLEY'S CAMPAIGN IN THE DECCAN.

BY CAPTAIN R. G. BURTON, 1ST INFANTRY, HYDERABAD CONTINGENT.

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which could as yet be only dimly discerned. The mighty figure of Napoleon loomed threateningly on the European horizon, and his shadow was cast darkly towards the East, where he dreamt of following in the footsteps of the great Macedonian, and where we had to combat not only native power and native intrigue, but French influence and French aggression.

It was against this French influence that Lord Wellesley, the Governor-General, had especially directed his attention, and it was with a view to counteracting it that he had but lately destroyed the power of Tipu Sultan. In July 1803 he thus expressed himself: "The effectual security of our interests in the Maratha Empire is the strongest barrier which can be opposed to the progress of the French interests in India; the early reduction of Sindhia would prove a fatal blow to the views of France. An imperfect arrangement with the Maratha powers, or a delay of active measures, might open to France the means of engaging with advantage in the affairs of the Maratha Empire." It was to his brother, Major-General the Honourable Arthur Wellesley, that the Governor-General entrusted the measures for the attainment of his object. And so it came about that the man who was to contribute so much to the downfall of Napoleon was also to be instrumental in quenching for ever the hope of French Empire in the East.

The Marathas, originally mere predatory bands, had become an organised nation under the rule of Sivaji. After his death the Government which he had inaugurated passed from the feeble hands of his successors, the Rajas of Satara, into those of the astute Brahmin Ministers, the Peshwas, who had their seat at Poona. Other Maratha princes, descended from officers of State—Sindhia, Holkar, Gaikwar and the Raja of Berar, called also the Bhonsla—held sway over a great part of India, and were attempting to consolidate their power from the Ganges to the Godavery.

These princes were all independent of each other, but in some measure acknowledged the Peshwa as their head, and nominally through him conducted the foreign affairs of the so-called confederacy. They, however, were by no means united, but had fought among themselves, and in 1802 Holkar, aiming at supremacy, had defeated the combined forces of Sindhia and the Peshwa, and had established himself at Poona, the seat of Government of the latter chief, and the nucleus of Maratha power. The Peshwa straightway fled to Bassein, and appealed to the British for protection.

Besides the Marathas, the East India Company had no other native power to fear. In the north, the Punjab had not as yet come within their sphere of influence. In the south, Tipu Sultan of Mysore had been lately crushed, whilst the Nizam of Hyderabad had removed the French officers from his service, and was closely allied with the British, whose interests were identical with his own.

The state of affairs in the Maratha Confederacy had already caused the assembly of a corps of observation 20,000 strong under General Stuart upon the north-west frontier of Mysore, for the effectual defence of the British possessions during the convulsed state of the Maratha

Empire, and the eventual establishment of a subsidiary force at Poona under the operation of the general defensive alliance concluded with the Peshwa.

Such was the aspect of affairs when the Peshwa sought the aid of the British, and concluded with their Government the treaty of Bassein, whereby, among other stipulations, he undertook to remove all foreigners from his service. A similar agreement had already been arrived at with the Gaikwar of Baroda.

In March 1803 Wellesley was detached by General Stuart with the following instructions:—

1. To encourage the Southern *jagirdars* to declare in favour of the Peshwa's cause; to employ every means to reconcile their mutual animosities, and to induce them to unite their forces with the advancing detachment for the purpose of re-establishing the Peshwa's Government.
2. To proceed to Merich, and form a junction with the Peshwa; or should that measure be deemed inadvisable on the part of His Highness, with such of his chieftains and troops as might be able to assemble there.
3. To open a communication and form a junction with the subsidiary force under Colonel Stevenson, and the contingent of His Highness the Nizam.
4. To proceed eventually to Poona and establish an order of things in that capital favourable to the return of the Peshwa, and the attainment of the ends of the late treaty.

In pursuance of these directions Wellesley commenced his advance on 9th March, was joined by a number of Maratha chiefs and *jagirdars* during his progress, and effected a junction with Colonel Stevenson on April 15th. He then, with his cavalry and the Maratha horse, made a rapid march on Poona, entering that city on April 20th in time to save it from destruction, and established the Peshwa on the throne, deposing the latter's brother Amrat Rao, who had been installed by Holkar, and who subsequently sided with the British against Sindhia and the Bhonsla.

Holkar, after making a predatory excursion to Aurangabad, drew off to the north on the approach of Stevenson's force, which Wellesley detached for the protection of the Nizam's dominions, and, owing to his enmity with Sindhia, held aloof from the coming contest; nor did he take further action against the British until 1804, when the campaign in the Deccan had already been brought to a successful conclusion.

It was then with Sindhia and the Raja of Berar, that the British had to deal, and for this purpose three armies had been assembled—one in Northern India under General Lake, with which we have no concern; and Wellesley's and Stevenson's forces already mentioned, whilst a corps of observation under General Campbell was stationed in the Raichur Doab. The occupation of Poona was followed by long and fruitless negotiations with these two chiefs, who acted with their usual duplicity, and procrastinated from day to day in the hope of concluding an alliance with Holkar. Wellesley was given full powers in



dealing with the Maratha Chieftains, and his despatches prove how much patience, diplomacy, and skill he exercised in this matter. Of the character of these people he wrote—In proportion as I gain experience of the Marathas. I have more reason to be astonished at the low unaccountable tricks which even the highest classes of them practice, with a view, however remote, to forward their own interest." At length, seeing that their sole object in continuing negotiations was to gain time, Wellesley moved out from Poona, directed his envoy, Colonel Collins, to leave the Maratha camp, and on the 7th August, having already warned the chiefs that he would commence hostilities unless they withdrew to their own territories, issued from his camp near Ahmednagar a proclamation amounting to a declaration of war.

At this time the strength and distribution of the opposing forces were as follows:—

Wellesley, in camp near Ahmednagar, with:—

*Cavalry—*

19th Light Dragoons	...	...	...	384 men.
4th Native cavalry	...	...	}	1,347 "
5th " "	...	...		
7th " "	...	...		

*Artillery—*

17 guns and	...	...	...	173 "
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*Infantry—*

74th regiment	...	...	}	1,368 "
78th regiment	...	...		
1st battalion, 2nd regiment, native infantry	}			5,631 "
1st and 2nd battalions, 3rd regiment, native infantry				
1st battalion, 8th regiment, native infantry	}			
2nd battalion, 12th regiment, native infantry				
2nd battalion, 18th regiment, native infantry				

He also had 653 pioneers of the establishment of Fort St. George, 2,400 cavalry, belonging to the Raja of Mysore, and about 3,000 Maratha horse.

Under Colonel Stevenson at Aurangabad were:—

*Cavalry—*

3rd and 6th regiments, native cavalry	...	909 men.
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*Artillery—*

120 "

*Infantry—*

His Majesty's Scotch brigade	...	...	778 *
2nd battalion, 2nd regiment, native Infantry	}		
1st battalion, 6th regiment, " "			
2nd battalion, 7th regiment, " "			
2nd battalion, 9th regiment, " "			
1st and 2nd battalions, 11th regiment, native infantry.			6,113 "

together with 276 gun lascars and 212 pioneers.

\* NOTE.—His Majesty's Scotch brigade afterwards became the 94th Foot.

Sindhia had a garrison at Ahmednagar, and was encamped at Jalgaon, some 35 miles north of the Ajanta Pass, whence he threatened the Nizam's territories, with an army of 18,000 horse, 11 battalions of infantry, 170 field guns, and 3 heavy guns.

The Raja of Berar, co-operating with Sindhia, had 20,000 horse, 6,000 infantry, 35 field guns, 500 rockets, and 500 camel guns.

Sindhia's infantry and artillery were officered by Europeans, and included four battalions of the famous Begum Sumroo, whose romantic history is related in Sleeman's *Reminiscences*. The infantry of the Raja of Berar was under the command of Beni Sing, and was well-trained and disciplined. Under the instruction and command of European adventurers, among whom may be mentioned de Boigne and Perron, the Maratha infantry and artillery had been brought to a high state of efficiency. But this organised infantry in some respects detracted from the power of the Confederacy, as Wellesley himself observed when he wrote in November 1803.

"Sindhia's armies had actually been brought to a very favourable state of discipline, and his power had become formidable by the exertions of the European officers in his service; but I think it is much to be doubted whether his power, or rather that of the Maratha nation would not have been more formidable, at least to the British Government, if they had never had an European, as an infantry soldier, in their service; and had carried on their operations, in the manner of the original Marathas, only by means of cavalry. I have no doubt whatever but that the military spirit of the nation has been destroyed by their establishments of infantry and artillery, possibly, indeed, by other causes; at all events it is certain that those establishments, however formidable, afford us a good object of attack in a war with the Marathas, and that the destruction of them contributes to the success of the contest; because, having made them the principal object of their attention, and that part of their strength on which they place most reliance, they become also the principal reliance of the army; and therefore when they are lost the cavalry will not act." This was written after the experience of Assaye, but may be quoted now in order to show the characteristics of the military force with which Wellesley had to contend. The British General might have added that the artillery and infantry of the Maratha army proved somewhat of an incumbrance, detracting from the mobility which rendered their predatory horsemen so famous in times gone by.

Before proceeding further with this narrative, it is advisable to give some description of the physical features of the country which was to form the theatre of operations in the coming campaign. The scene of the approaching conflict lay within that part of India known as the Deccan, situated between the Tapti and Kistna rivers. It contained within its limits the Maratha states of Poona and Satara; the territory of the Raja of Berar, and, about Ahmednagar, a portion of that of Sindhia; also the district of Khandesh, and the northern part of the dominions of the Nizam of Hyderabad, an independent prince, formerly a vassal of the Moghal Emperor.

This extensive region consists in the main of an elevated plateau, from one to two thousand feet above the level of the sea. Its northern

boundary, between the Tapti river and the plains of Berar and Khandesh, is characterised by a lofty range of rugged hills, known as the Satpuras, covered with dense forest, and rising to a height of 4,000 feet above sea-level. On the outlying peaks of this range, like sentinels guarding the passes from the north, stand the fortresses of Asirgarh, Narnala, and Gawilgarh, built of massive stone. From these strongholds in the mountains marauding parties of Pindaris had been in the habit of issuing forth to prey on the rich countries that lay at their feet. Below the Satpuras stretches the fertile valley of Berar, watered in due season by many streams, and having a rich alluvial surface known as black cotton soil, which bears fine crops of millet, wheat, and cotton. This expanse of plain is now nearly all under cultivation, but at the period of the war it was probably in part covered with jungle. The numerous villages dotted over the land testify to the prosperity of the inhabitants, whilst the fact that each hamlet contains a dilapidated mud fort proves that they date at least as far back as the turbulent times of the last century.

The south-west frontier of Berar, and the boundary of Khandesh which lies upon its border are marked by a spur of the Western Ghats, through which there are several passes, including those of Kesari, Ajanta, and Rajura, steep on their northern outlet, but more easy of access where they debouch into the plains on the south. These hills, though not so lofty, wide, or well-watered, are similar in nature to the Satpuras, whilst to the south of them the soil, though not quite so rich, and the general aspect of the country are similar to North Berar, but the level is frequently broken by low stony or rocky hills, a range of which stretches from near Aurungabad to Jalna.

Three great streams, the Tapti, Godavari, and Kistna, rising in the Western Ghats, water the whole of this region, receiving many tributaries in their course. During the rainy season the water-courses, after a heavy downfall, become rapid and turbid streams, and many of them which have previously been dry or have contained only occasional pools of water are transformed into unfordable torrents. When the rain ceases, however, and with it the supply of water, these rivers soon run off again, and are mostly easily passable, except the larger ones such as the Godavari, Pein Gunga and Kistna, which are generally fordable only during the dry season. In the hot weather, and sometimes in the cold season, only the larger rivers and nullahs contain water, varying in quantity according to the prevailing atmospheric conditions.

During the prevalence of the south-west monsoon, from June to September, the black cotton soil which under the heart of the summer sun has been burnt up and is cracked into innumerable fissures, is converted by heavy rain from an arid desert into a kind of quagmire over which men and horses move with difficulty, whilst it is quite impassable for wheeled traffic; but a day or two of sunshine soon dries the surface of the ground. The fields in this country as a rule have no fences or hedges; the villages are built of mud, sometimes on a foundation of stone, and are frequently surrounded by a few acres of gardens and enclosures.

The British General was already acquainted with a part of Southern Maratha territory, where he had been employed in the year

1800 in the destruction of Dhundia Wagh, a powerful bandit who had assumed the high-sounding title of "King of the world."

He had, moreover, with a political foresight no less remarkable than his military skill, foreseen the probability of a conflict with the Marathas, and with this in view had in 1801 written a memorandum regarding operations in the southern portion of their territory. In this document the time of year most favourable for such an undertaking is discussed in the following terms :—

"The season at which it is most convenient to commence a campaign with the Marathas is that at which the rivers, which take their rise in the Western Ghauts, fill. This happens generally in the month of June. The reasons why I think that the most favourable season for operations against the Marathas are as follows :

First. The Maratha army is principally composed of cavalry, and their plan of operations against a British army would be to endeavour to cut off its communication with its rear, and to impede the junction of its supplies from the Mysore country. As the rivers are not fordable, as there are no bridges and no means of passing them excepting by basket boats, which it is difficult, and might be rendered impossible to procure, the fulness of the rivers operates as a barrier. It is certain that the enemy cannot pass them in large numbers, and it is probable that they would not venture to throw across a small body, or rather, that they would not be able to prevail upon a small body to remain on a different side from the main body of their army.

The inconvenience and delay which the British army experience in crossing the rivers by means of boats, when they are full, is trifling; and in fact they would experience no inconvenience or delay, if good pontoons were provided, and a bridge were thrown across each river for the passage of the army. The communication might afterwards be kept up by means of the common basket boats. If the army should be thus equipped with a bridge, the Marathas would never dare to detach a body across any river for the purpose of annoying our communications. Thus then we should enjoy all the advantage of a river not fordable, to shorten our line of communications, which river our enemy could not pass with a large body of troops, and over which he would not care to detach a small body; and we should have it in our power to pass it with as much ease, and with as little inconvenience and delay as we should experience if the river were fordable.

Secondly, the Maratha country in general is but ill-supplied with water. The rains which fill these rivers, although not heavy at the beginning of the rainy season, are sufficient to fill many nullahs; and an army has at this time some chance of being supplied with water, of which, in the dry season, it is certain it would never find much, and frequently none. The inconvenience to be apprehended from the rains is trifling. It is true that heavy rain would ruin the cattle of the army, and would put the roads in such a state as to render them impracticable for wheel carriages. But heavy rain for any long continuance is not to be expected in the Maratha territory; and particularly not early in the season.

The produce of this fertile country is *jowari* (millet) principally, and other dry grains, but no rice. This is the great difficulty with

which our army would have to contend. The rice which must be procured for them must be brought from the distant rice countries in Mysore or from Canara, with which country in the rainy season it is impossible to keep up a communication.

The army also might depend upon procuring some sheep and bullocks in the Maratha territory; but if its European force should be large, it will certainly require supplies of the former from Mysore, and in any case supplies from thence of the latter.

It is well known that *jowari* straw is the best kind of forage for horses and cattle, and of this there is an abundance everywhere, and besides this forage, it seldom happens that green forage cannot be found.

From this it will be understood that the most difficult problem which offered itself for solution to the British commander was that of supply and transport, perhaps the most important question in all operations of war; and it is noteworthy that it was to the details of this matter that Wellesley devoted his most careful attention in this, as in his other campaigns. He procured rice for his troops from Mysore. He arranged for a large supply of Government cattle, and also enlisted the services of a large number of Brinjaras (1) with their pack bullocks, and in fact no detail escaped his notice.

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(1) NOTE.—The Brinjaras deserve more than a passing mention. Until the spread of modern means of communication—of good roads and lines of railway throughout the country—the greater part of the carrying trade of India was in their hands. With their droves of pack bullocks, laden with grain and other merchandise, they traversed the length and breadth of the land, and were especially of great service in the supply of armies in the field. Although considerable numbers may yet be met with, especially in remote tracts, their occupation has almost gone, and they have in many cases abandoned their nomadic life, and settled down in village communities. Formerly possessed of considerable wealth, the Brinjaras, averse as they are to agricultural pursuits, are now often reduced to poverty, and are probably greatly decreasing in numbers.

It has always appeared to me strange that attention has not been directed to them as a source of recruiting. Physically a fine race, they are possessed of many excellent qualities which should fit them well for military service. I have found them more straightforward and trustworthy than most other natives of the country, and have always been very favourably impressed by their manly bearing. In the course of frequent expeditions in pursuit of big game they have been of great service to me; keen, careless, and intelligent, they make the very best of beaters, and exhibit great skill in following up and marking down wild animals, whilst their endurance in the chase is wonderful.

The following extract from the *Journal of Major-General Sir Jasper Nicolls*, written in the field, 25th October 1803, is interesting, in connection with the Brinjaras:—"General Wellesley has always made it a point to encourage these people, by promises, kindnesses, presents, indeed, by every kind of liberality of which he possesses the means, to attend our camp, and collect grain for the army. He advances them money; takes their grain when not immediately wanted; gets the duties on its transport remitted; procures permits to collect it in our allies' territory; gives or orders escorts; provides guards in camp or whenever required; whenever they meet extraordinary losses he balances them by the price; and not seldom has he ordered two or three rupees a head as a reward for each bullock brought. In the case above mentioned, he was generous to the Brinjaras (a case where some unexpectedly joined his camp with 3,000 bullock loads of grain, having been induced to do so by the *Kotwal*, or Chief Civil Magistrate, who cannot well be considered the subjects of any particular prince, who could revenge himself upon them. To the *Kotwal* he gave a heavy pair of gold bangles, of which he considerably enhanced the value by putting them on his wrists with his own hands."

It had already been determined that the first act of war should be the capture of Ahmednagar, the possession of which would ensure the safety of the line of communications with Poona and Bombay, whilst it would cut off from the hostile princes such of the Southern Maratha chieftains as were discontented with the order of things established by the British Government. On the 8th August Wellesley advanced to attack this stronghold, which was held by some 5,000 men, including a body of Arabs and some cavalry. The fortress and *pettah*, or native town, were enclosed within the usual outer wall of mud and stone, about eighteen feet high with small bastions at every hundred yards. The Fort itself was one of the strongest in India. It was nearly circular in shape, and was built of solid stone, having a wide ditch all round it. It had large bastions at short intervals, mounted with at least sixty guns, from 12 to 52-pounders. On a large tower or barbette stood the Mahalachmi, a brass gun about 22 feet in length, carrying a ball 17 pounds in weight.

Colonel Welsh, who was present, gives in his *Military Reminiscences* the following description of the attack on the outer wall :

"We had not hitherto seen the face of an enemy, and now for the first time perceived the walls of both the *Pettah* and the fort lined with men, whose arms glittered in the sun, whilst another body of troops was encamped outside, between them. As we stood with the General, reconnoitring from a small elevated spot, within long gun-shot of both places, he directed the leaders where they were to fix their ladders : but unaware that there was no rampart, we were ordered to escalate the curtains without breaching. The fort lay on our right hand, and the *pettah* in front, within gun-shot of each other ; when the first column was ordered to attempt a long curtain to the extreme left having a high building immediately in its rear. The ladders were speedily planted and the assault made ; but each man as he ascended fell, hurled from the top of the wall. This unequal struggle lasted about ten minutes, when they desisted, with the loss of about fifteen killed and about fifty wounded ; amongst whom were Captains Duncan Grant, Mackenzie, and Humberstone, and Lieutenant Anderson, killed ; and Lieutenant Larkins mortally wounded. The third party to the right advanced nearly at the same moment, but a gun-elephant taking fright at the firing from the fort, ran down the centre of our column, which occasioned no little confusion, and some delay, giving the enemy more time and means to oppose the first attack. Being furnished with two scaling ladders only, we reached the curtain and planted them at the very re-entering angle formed by a small bastion, the enemy playing some heavy guns on us from the fort. Such a rush was made at first that one ladder broke down with our gallant leader and several men, and we were forced to work hard with the other. Captain Vesey was then a very stout heavy man ; but what impediment, short of death, can arrest a soldier at such a crisis ? He was soon on the bastion, surrounded by men determined to carry everything before them. Our two European companies had all scrambled up, and about one hundred and fifty or two hundred of the 3rd, when a cannon shot smashed our last ladder, and broke the thigh of my Subadar. We were now a party

of three hundred men, left solely to our own resources, and dashing down we scoured all the streets near the wall, the enemy only once making a stand, and suffering accordingly. At length, arriving near a gate, marked out for the centre attack, and, a loud peal of cannon and musketry from without announcing the second party under Colonel Wallace, we drove all the defenders before us, and some of our men opened the gate while they were battering at it from the outside, by which one of our party was killed. Our loss was eleven killed and twenty-two wounded, including Lieutenant Plenderleath killed, and Lieutenant Nielson wounded. Our two parties now uniting under Colonel Wallace soon succeeded in clearing the place of our opponents, who we afterwards learnt were one thousand five hundred Arabs and about three thousand Marathas, few if any of whom reached the fort, but were forced to fly in the other direction. The second column had but few casualties ; and thus we had the quiet possession of a very fine and rich town, with a few prisoners, by three o'clock. Our total loss in killed and wounded being one hundred and sixty men."

All the garrison, including the Arabs, except those required to man the fort, made their escape during the night after this assault. Next day the batteries opened upon the citadel, a breach was soon made, and the bombardment was continued for two days. But the enemy did not stand for another assault and asked for and obtained terms of capitulation, under which, to the number of 1,400, they marched out and were allowed to depart with all their private property. These men became subsequently a horde of lawless plunderers, but eventually met with retribution as will be related hereafter. Thus fell a place which Wellesley described as the strongest fortress he had seen. A wild scene of disorder followed, soldiers and sepoys all taking part in plundering Sindhia's palace and other buildings, nor did the looting cease until two Native soldiers had been seized and summarily hanged in the gateway of the palace.

The capture of this fortress was not important only by reason of its situation and strength, but from the great moral effect it had upon the Natives, doubtless determining many who were in doubt as to which side they would take. Gokla, a Maratha Chief in the British camp, wrote to his friends at Poona :—" These English are a strange people, and their General is a wonderful man ; they came here in the morning, looked at the Pettah wall, walked over it, killed all the garrison and returned to breakfast ! what can withstand them ?"

The care of his wounded, the settlement of the conquered districts around Ahmednagar, and the difficulties of supply and transport, prevented Wellesley from quitting that place for some time. However, Stevenson had already been despatched eastwards, and was moving between Aurungabad and Jafarabad, keeping watch upon the enemy's movements, and guarding the passes through the Ajanta hills.

At length, on August 18th, Wellesley moved towards the Godavari, which was crossed between Senbugaon and Toka, the passage occupying a week, for the river was wide, deep, and swift. The

army crossed in wicker boats made by the troops from the jungle and covered with bullock skins. It is probable that these boats were constructed of a kind of willow known as *sumbalu* which grows profusely in many parts of the Deccan, and makes excellent gabions.

The difficulties of supply with which the General had to contend will be understood from the following extract from a letter he wrote to Major Shawe on 24th August :—

“Twelve days have elapsed since I took Ahmednagar ; and in that time I have marched nearly fifty miles, and have crossed the river Godavari : having settled our conquests south of that river, I hope to get on equally well in the future ; but I tremble for the want of the common country grains for the followers and cattle. The country is completely exhausted, the villages depopulated, and large tracts of excellent land uncultivated. Indeed, I believe that these facts are the principal causes of Holkar's keeping aloof from the confederates. We have lost such numbers of cattle by the length of our march and starvation, that we have none to carry grain for our followers and I learn that we have lost vast numbers of those coming from General Stuart's army ; I believe nearly one-half of the whole number.

However, large numbers of dealers attend the camp, who came with me from Mysore ; and if the Nizam's servants afford us any supplies, we shall still do tolerably well. I have plenty for the troops, and it may be depended upon that I will do everything in my power to procure what is wanted for the followers.”

Wellesley's movements in this campaign have been described as complicated, though skilful. Skilful indeed they were, following every manœuvre of the enemy, yet a study of the map and of the British general's correspondence shows that his movements were exceedingly simple until after the battle of Assaye, when it becomes more difficult to follow them.

On August 26th he wrote to Colonel Murray : “ Since the beginning of the war, Colonel Stevenson has been exposed, single-handed, to the united armies of Sindhia and the Raja of Berar. Not a Maratha horseman has been able to show himself in the Nizam's territories, and Colonel Stevenson on the 23rd played the Maratha trick upon them, by cutting off some of their supplies.

Nevertheless the Maratha chiefs, taking advantage of Stevenson's absence to the east, entered the Nizam's territories, with their horse only, on 24th August by the Ajanta Ghaut, and spread their Pindaris over the country, concentrating their main force in the direction of Jalna. Wellesley now advanced to Aurungabad, and thence moved south to the Godavari, and kept along that river in order to prevent the enemy from crossing it, and carrying out their declared intention of marching on Hyderabad, which lay some 250 miles to the south-east.

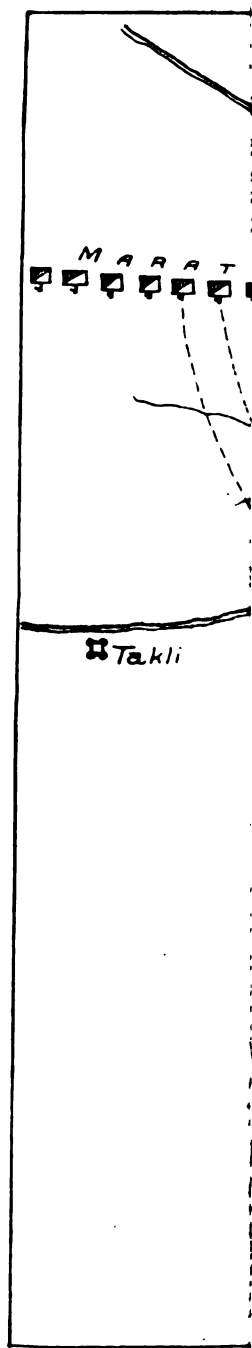
Stevenson, advancing from Jafarabad, stormed and took the fort of Jalna on September 2nd, and during the next few days made night attacks on several of the enemy's camps, and forced him to retire in a northerly direction. Wellesley at the same time moved northwards, and checked the enemy's movement to the south, forcing him towards



the Ajanta hills. Sindhia had in the mean time been joined by his infantry and heavy guns, and the whole of the strength of the two Maratha chieftains was now concentrated to the south of the Ajanta pass. On September 21st Wellesley's and Stevenson's forces had converged to within twelve miles of each other, north of Jalna, and on that date the two British commanders met and concerted a plan to attack the enemy's camp simultaneously on the morning of the 24th. They marched on the 22nd, Stevenson by the western route, and Wellesley round the low, flat-topped hills between Badnapur and Jalna. The enemy was reported to be at Bokardhan, and, acting on this information, Wellesley moved forward from Nalni on September 23rd, intending to arrive within a convenient distance for striking the enemy on the following day. But the intelligence proved false, and he suddenly and unexpectedly found himself in the presence of the hostile armies, which were drawn up on a tongue of land enclosed by the Juah and Kelna rivers, their left resting on the village of Assaye, their right stretching for six miles in a westerly direction towards Bokardhan. It may appear at first sight that the duties of reconnoitring had been neglected by the cavalry, but it was impossible to view the enemy's positions until the main body of the army was brought up, as they were always surrounded by immense bodies of horse. Thus it was that, Stevenson being still at a distance, Wellesley found himself called upon to face the alternative of attacking an enemy over 50,000 strong with 230 guns, with a force of 6,000 men and 17 guns, or else retreating to await the arrival of his other army. To have retired would have been to bring around him a swarm of 40,000 Maratha horse, who would in all probability have destroyed his small force. With a determination that was a flash of genius worthy of a great commander, he at once resolved to attack, at the same instant perceiving the best method of carrying out his intention.

The enemy's left and centre were composed of infantry drawn up in several lines, in front of which their guns stood ready to vomit forth death upon the assailants. A dense mass of horse was arrayed upon the right, stretching away towards the west as far as eye could reach. In front of the hostile position, the Kelna river, with steep banks cut into by innumerable fissures, ran deep and swift, swollen by the rains that had lately fallen. Beyond it, at a distance varying from half a mile to a mile of undulating ground, flowed the Juah river, on the hither bank of which stood the village of Assaye. But between the hamlets of Pipalgaon and Warur on the Kelna river was a ford, which the enemy had neglected to occupy, betrayed at once to the eagle eye of the British commander by the position of the villages on either bank. He at once perceived that he could turn the Maratha left, forcing them to change front and to confine their line to a narrow space where superiority of numbers would give them but little advantage.

Favoured by the ground, this operation was carried out successfully, and was not detected by the enemy until the passage was secured. Sindhia at once presented a new front, with his left resting on Assaye, and his right on the Kelna river.



dealing with the Maratha Chieftains, and his despatches prove how much patience, diplomacy, and skill he exercised in this matter. Of the character of these people he wrote—In proportion as I gain experience of the Marathas. I have more reason to be astonished at the low unaccountable tricks which even the highest classes of them practice, with a view, however remote, to forward their own interest." At length, seeing that their sole object in continuing negotiations was to gain time, Wellesley moved out from Poona, directed his envoy, Colonel Collins, to leave the Maratha camp, and on the 7th August, having already warned the chiefs that he would commence hostilities unless they withdrew to their own territories, issued from his camp near Ahmednagar a proclamation amounting to a declaration of war.

At this time the strength and distribution of the opposing forces were as follows:—

Wellesley, in camp near Ahmednagar, with:—

*Cavalry—*

19th Light Dragoons	...	...	...	384 men.
4th Native cavalry	...	...	}	1,347 "
5th " "	...	...		
7th " "	...	...		

*Artillery—*

17 guns and	...	...	...	173 "
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*Infantry—*

74th regiment	...	...	}	1,368 "
78th regiment	...	...		
1st battalion, 2nd regiment, native infantry	}			5,631 "
1st and 2nd battalions, 3rd regiment, native infantry				
1st battalion, 8th regiment, native infantry	}			
2nd battalion, 12th regiment, native infantry				
2nd battalion, 18th regiment, native infantry				

He also had 653 pioneers of the establishment of Fort St. George, 2,400 cavalry, belonging to the Raja of Mysore, and about 3,000 Maratha horse.

Under Colonel Stevenson at Aurangabad were:—

*Cavalry—*

3rd and 6th regiments, native cavalry	...	909 men.
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*Artillery—*

120 "

*Infantry—*

His Majesty's Scotch brigade	...	}	778 "
2nd battalion, 2nd regiment, native Infantry	...		
1st battalion, 6th regiment,	" "	}	6,113 "
2nd battalion, 7th regiment,	" "		
2nd battalion, 9th regiment,	" "		
1st and 2nd battalions, 11th regiment, native infantry.	" "		

together with 276 gun lascars and 212 pioneers.

\* NOTE.—His Majesty's Scotch brigade afterwards became the 94th Foot.

Sindhia had a garrison at Ahmednagar, and was encamped at Jalgaon, some 35 miles north of the Ajanta Pass, whence he threatened the Nizam's territories, with an army of 18,000 horse, 11 battalions of infantry, 170 field guns, and 3 heavy guns.

The Raja of Berar, co-operating with Sindhia, had 20,000 horse, 6,000 infantry, 35 field guns, 500 rockets, and 500 camel guns.

Sindhia's infantry and artillery were officered by Europeans, and included four battalions of the famous Begum Sumroo, whose romantic history is related in Sleeman's *Reminiscences*. The infantry of the Raja of Berar was under the command of Beni Sing, and was well-trained and disciplined. Under the instruction and command of European adventurers, among whom may be mentioned de Boigne and Perron, the Maratha infantry and artillery had been brought to a high state of efficiency. But this organised infantry in some respects detracted from the power of the Confederacy, as Wellesley himself observed when he wrote in November 1803.

"Sindhia's armies had actually been brought to a very favourable state of discipline, and his power had become formidable by the exertions of the European officers in his service; but I think it is much to be doubted whether his power, or rather that of the Maratha nation would not have been more formidable, at least to the British Government, if they had never had an European, as an infantry soldier, in their service; and had carried on their operations, in the manner of the original Marathas, only by means of cavalry. I have no doubt whatever but that the military spirit of the nation has been destroyed by their establishments of infantry and artillery, possibly, indeed, by other causes; at all events it is certain that those establishments, however formidable, afford us a good object of attack in a war with the Marathas, and that the destruction of them contributes to the success of the contest; because, having made them the principal object of their attention, and that part of their strength on which they place most reliance, they become also the principal reliance of the army; and therefore when they are lost the cavalry will not act." This was written after the experience of Assaye, but may be quoted now in order to show the characteristics of the military force with which Wellesley had to contend. The British General might have added that the artillery and infantry of the Maratha army proved somewhat of an incumbrance, detracting from the mobility which rendered their predatory horsemen so famous in times gone by.

Before proceeding further with this narrative, it is advisable to give some description of the physical features of the country which was to form the theatre of operations in the coming campaign. The scene of the approaching conflict lay within that part of India known as the Deccan, situated between the Tapti and Kistna rivers. It contained within its limits the Maratha states of Poona and Satara; the territory of the Raja of Berar, and, about Ahmednagar, a portion of that of Sindhia; also the district of Khandesh, and the northern part of the dominions of the Nizam of Hyderabad, an independent prince, formerly a vassal of the Moghal Emperor.

This extensive region consists in the main of an elevated plateau, from one to two thousand feet above the level of the sea. Its northern

boundary, between the Tapti river and the plains of Berar and Khandesh, is characterised by a lofty range of rugged hills, known as the Satpuras, covered with dense forest, and rising to a height of 4,000 feet above sea-level. On the outlying peaks of this range, like sentinels guarding the passes from the north, stand the fortresses of Asirgarh, Narnala, and Gawilgarh, built of massive stone. From these strongholds in the mountains marauding parties of Pindaris had been in the habit of issuing forth to prey on the rich countries that lay at their feet. Below the Satpuras stretches the fertile valley of Berar, watered in due season by many streams, and having a rich alluvial surface known as black cotton soil, which bears fine crops of millet, wheat, and cotton. This expanse of plain is now nearly all under cultivation, but at the period of the war it was probably in part covered with jungle. The numerous villages dotted over the land testify to the prosperity of the inhabitants, whilst the fact that each hamlet contains a dilapidated mud fort proves that they date at least as far back as the turbulent times of the last century.

The south-west frontier of Berar, and the boundary of Khandesh which lies upon its border are marked by a spur of the Western Ghats, through which there are several passes, including those of Kesari, Ajanta, and Rajura, steep on their northern outlet, but more easy of access where they debouch into the plains on the south. These hills, though not so lofty, wide, or well-watered, are similar in nature to the Satpuras, whilst to the south of them the soil, though not quite so rich, and the general aspect of the country are similar to North Berar, but the level is frequently broken by low stony or rocky hills, a range of which stretches from near Aurungabad to Jalna.

Three great streams, the Tapti, Godavari, and Kistna, rising in the Western Ghats, water the whole of this region, receiving many tributaries in their course. During the rainy season the water-courses, after a heavy downfall, become rapid and turbid streams, and many of them which have previously been dry or have contained only occasional pools of water are transformed into unfordable torrents. When the rain ceases, however, and with it the supply of water, these rivers soon run off again, and are mostly easily passable, except the larger ones such as the Godavari, Pein Gunga and Kistna, which are generally fordable only during the dry season. In the hot weather, and sometimes in the cold season, only the larger rivers and nullahs contain water, varying in quantity according to the prevailing atmospheric conditions.

During the prevalence of the south-west monsoon, from June to September, the black cotton soil which under the heart of the summer sun has been burnt up and is cracked into innumerable fissures, is converted by heavy rain from an arid desert into a kind of quagmire over which men and horses move with difficulty, whilst it is quite impassable for wheeled traffic; but a day or two of sunshine soon dries the surface of the ground. The fields in this country as a rule have no fences or hedges; the villages are built of mud, sometimes on a foundation of stone, and are frequently surrounded by a few acres of gardens and enclosures.

The British General was already acquainted with a part of Southern Maratha territory, where he had been employed in the year

operations, separated from the Raja of Berar, whilst Wellesley marched back to Ajanta, and descended the Ghaut to Ferdapur to stop the former chieftain.

In the meantime Stevenson entered Barhanpur without opposition on October 16th, and then invested Asirgarh, took the Pettah on the 18th with a loss of two killed and five wounded, and, having erected a battery against the fort, gained possession of it by capitulation on the 21st.

The Raja of Berar had now moved to the southward, and had entered the Nizam's dominions by the Kesari Ghaut, so Wellesley was again obliged to turn towards the west. The marches and countermarches of the British general may be followed on the map, and are best described in his own words, written on October 26th :—" Since the battle of Assaye I have been like a man who fights with one hand and defends himself with the other. With Colonel Stevenson's corps I have acted offensively and defended the territories of the Nizam and the Peshwa. In doing this I have made some terrible marches, but I have been singularly fortunate : first, in stopping the enemy when they intended to pass to the southward, through the Casserbarry (Kesari) Ghaut ; and afterwards, by a rapid march to the northward, in stopping Sindhia when he was moving to interrupt Colonel Stevenson's operations against Asirgarh ; in which he would otherwise undoubtedly have succeeded. I moved up the Ghaut as soon as Colonel Stevenson got possession of Asirgarh ; and I think that in a day or two I shall turn Ragoji Bhonsla, who has passed through to the southward. At all events I am in time to prevent him doing any mischief."

These masterly movements were entirely successful. By a long march to the south, Wellesley succeeded in turning back the army of the Raja of Berar, causing him to fly along the Godavari and driving him back again into his own country, whither he followed him down the Ajanta Ghaut on November 25th.

In carrying out these operations, the British General had many difficulties to contend with. He had to cover the approach of his own convoys from the south, whilst from his allies he received no assistance, and frequently experienced opposition. The Government of Hyderabad was even then scarcely less effete and corrupt than that of the Maratha States, and the officials of the Nizam were many of them in league with the enemy, and in some cases refused to admit the British wounded to the protection of their forts.

The marches of the British army during the latter end of October, and the beginning of November, were among the most remarkable recorded in history, carried out as they were in pursuit of a mobile enemy, through a difficult country, encumbered with a heavy artillery train.

Regarding the march of the army, the following occurs in the *Journal of Major-General Sir Jasper Nicolls* :—" Six roads up the Ghauts are now open. Here it may not be out of place to mention that, immediately on our coming to our ground each day, the neighbouring villagers are sent for, and the Captain of the Guides, after comparing their accounts, takes down all the necessary information

relative to the roads to the flanks and front, where and in what quantity water is procurable; this is the main object of enquiry, unless where Ghauts are to be passed, or rivers forded; the latter, however, rarely occurs. After the camp has been pitched and the men been refreshed, the officers of Pioneers examine the adjoining roads, and take care that a passage to the front and one to each flank are prepared, at least for the distance of one mile."

With regard to the order of march, the same *Journal* tells us:—"The general was beat at half-past four, the assembly at half-past five, and we marched immediately after. Since the 8th of last month (September) General Wellesley has left off the usual mode of announcing the march or halt of the army in order to prevent the enemy from having intelligence of the intended marches of this division. At present no person can certainly foretell whether the army is to move or not, except when the General has positively determined that he will not, and then he acquaints the heads of departments that they may profit of the time.

A body of Mysore horse, about four hundred, leads the column of march; this, at some distance, is followed by the cavalry; the new picquets of infantry march in their rear, then the line of infantry, followed by the park, store, and provision carts; the guns of the allies close the line of carriages, the ammunition and park bullocks follow them, and the rear guard, consisting of the old picquets; a squadron of cavalry, which moves on the reverse flank, and another body of four hundred Mysoreans, close the line.

Detachments of pioneers attend the leading divisions of the cavalry, advanced guard, the line, and the park. Guides are sent every morning before the assembly beating to the heads of the cavalry advanced and rear guard. The baggage is ordered to be kept on the reverse flank entirely. The horsemen of the allies march on either flank, as most agreeable to their leaders. The Brigadier of Cavalry is ordered to halt whenever he may exceed the distance of three-quarters of a mile in front of the infantry; the long roll for a halt is to be beat by any corps the march of which may by accident be so long stopped as to occasion a break of one hundred yards: this to be repeated from front to rear by every corps; and when ready to move again the taps are passed, as before, along the line, which proceeds."

Towards the middle of November Sindhia made overtures of peace, and Wellesley, in an agreement concluded with his envoy at Rajura on the 23rd of that month, assented to cease hostilities with him, provided he would keep at a distance of at least forty miles to the eastward of Ellichpur. Still pursuing the Bhonsla northwards through Berar, the British Commander was joined by Stevenson on November 29th at Patholi, near which place the latter had halted on his way to the investment of Gawilgarh. It was not until the afternoon of that day that the British army came into contact with the enemy, who were drawn up on a broad plain in front of the village of Argaum. This plain is intersected by innumerable water-courses which drain the southern slopes of the Satpura hills, and empty themselves into the Purna river. Approaching Argaum from the south one passes through an area of almost unbroken cultivation, perhaps one of the richest cotton and

It had already been determined that the first act of war should be the capture of Ahmednagar, the possession of which would ensure the safety of the line of communications with Poona and Bombay, whilst it would cut off from the hostile princes such of the Southern Maratha chieftains as were discontented with the order of things established by the British Government. On the 8th August Wellesley advanced to attack this stronghold, which was held by some 5,000 men, including a body of Arabs and some cavalry. The fortress and *pettah*, or native town, were enclosed within the usual outer wall of mud and stone, about eighteen feet high with small bastions at every hundred yards. The Fort itself was one of the strongest in India. It was nearly circular in shape, and was built of solid stone, having a wide ditch all round it. It had large bastions at short intervals, mounted with at least sixty guns, from 12 to 52-pounders. On a large tower or barbette stood the Mahalachmi, a brass gun about 22 feet in length, carrying a ball 17 pounds in weight.

Colonel Welsh, who was present, gives in his *Military Reminiscences* the following description of the attack on the outer wall :

"We had not hitherto seen the face of an enemy, and now for the first time perceived the walls of both the Pettah and the fort lined with men, whose arms glittered in the sun, whilst another body of troops was encamped outside, between them. As we stood with the General, reconnoitring from a small elevated spot, within long gun-shot of both places, he directed the leaders where they were to fix their ladders : but unaware that there was no rampart, we were ordered to escalate the curtains without breaching. The fort lay on our right hand, and the pettah in front, within gun-shot of each other ; when the first column was ordered to attempt a long curtain to the extreme left having a high building immediately in its rear. The ladders were speedily planted and the assault made ; but each man as he ascended fell, hurled from the top of the wall. This unequal struggle lasted about ten minutes, when they desisted, with the loss of about fifteen killed and about fifty wounded ; amongst whom were Captains Duncan Grant, Mackenzie, and Humberstone, and Lieutenant Anderson, killed ; and Lieutenant Larkins mortally wounded. The third party to the right advanced nearly at the same moment, but a gun-elephant taking fright at the firing from the fort, ran down the centre of our column, which occasioned no little confusion, and some delay, giving the enemy more time and means to oppose the first attack. Being furnished with two scaling ladders only, we reached the curtain and planted them at the very re-entering angle formed by a small bastion, the enemy playing some heavy guns on us from the fort. Such a rush was made at first that one ladder broke down with our gallant leader and several men, and we were forced to work hard with the other. Captain Vesey was then a very stout heavy man ; but what impediment, short of death, can arrest a soldier at such a crisis ? He was soon on the bastion, surrounded by men determined to carry everything before them. Our two European companies had all scrambled up, and about one hundred and fifty or two hundred of the 3rd, when a cannon shot smashed our last ladder, and broke the thigh of my Subadar. We were now a party



of three hundred men, left solely to our own resources, and dashing down we scoured all the streets near the wall, the enemy only once making a stand, and suffering accordingly. At length, arriving near a gate, marked out for the centre attack, and, a loud peal of cannon and musketry from without announcing the second party under Colonel Wallace, we drove all the defenders before us, and some of our men opened the gate while they were battering at it from the outside, by which one of our party was killed. Our loss was eleven killed and twenty-two wounded, including Lieutenant Plenderleath killed, and Lieutenant Nielson wounded. Our two parties now uniting under Colonel Wallace soon succeeded in clearing the place of our opponents, who we afterwards learnt were one thousand five hundred Arabs and about three thousand Marathas, few if any of whom reached the fort, but were forced to fly in the other direction. The second column had but few casualties; and thus we had the quiet possession of a very fine and rich town, with a few prisoners, by three o'clock. Our total loss in killed and wounded being one hundred and sixty men."

All the garrison, including the Arabs, except those required to man the fort, made their escape during the night after this assault. Next day the batteries opened upon the citadel, a breach was soon made, and the bombardment was continued for two days. But the enemy did not stand for another assault and asked for and obtained terms of capitulation, under which, to the number of 1,400, they marched out and were allowed to depart with all their private property. These men became subsequently a horde of lawless plunderers, but eventually met with retribution as will be related hereafter. Thus fell a place which Wellesley described as the strongest fortress he had seen. A wild scene of disorder followed, soldiers and sepoys all taking part in plundering Sindhia's palace and other buildings, nor did the looting cease until two Native soldiers had been seized and summarily hanged in the gateway of the palace.

The capture of this fortress was not important only by reason of its situation and strength, but from the great moral effect it had upon the Natives, doubtless determining many who were in doubt as to which side they would take. Gokla, a Maratha Chief in the British camp, wrote to his friends at Poona:—"These English are a strange people, and their General is a wonderful man; they came here in the morning, looked at the Pettah wall, walked over it, killed all the garrison and returned to breakfast! what can withstand them?"

The care of his wounded, the settlement of the conquered districts around Ahmednagar, and the difficulties of supply and transport, prevented Wellesley from quitting that place for some time. However, Stevenson had already been despatched eastwards, and was moving between Aurungabad and Jafarabad, keeping watch upon the enemy's movements, and guarding the passes through the Ajanta hills.

At length, on August 18th, Wellesley moved towards the Godavari, which was crossed between Senbugaon and Toka, the passage occupying a week, for the river was wide, deep, and swift. The

army crossed in wicker boats made by the troops from the jungle and covered with bullock skins. It is probable that these boats were constructed of a kind of willow known as *sumbalu* which grows profusely in many parts of the Deccan, and makes excellent gabions.

The difficulties of supply with which the General had to contend will be understood from the following extract from a letter he wrote to Major Shawe on 24th August :—

“Twelve days have elapsed since I took Ahmednagar ; and in that time I have marched nearly fifty miles, and have crossed the river Godavari : having settled our conquests south of that river, I hope to get on equally well in the future ; but I tremble for the want of the common country grains for the followers and cattle. The country is completely exhausted, the villages depopulated, and large tracts of excellent land uncultivated. Indeed, I believe that these facts are the principal causes of Holkar's keeping aloof from the confederates. We have lost such numbers of cattle by the length of our march and starvation, that we have none to carry grain for our followers and I learn that we have lost vast numbers of those coming from General Stuart's army ; I believe nearly one-half of the whole number.

However, large numbers of dealers attend the camp, who came with me from Mysore ; and if the Nizam's servants afford us any supplies, we shall still do tolerably well. I have plenty for the troops, and it may be depended upon that I will do everything in my power to procure what is wanted for the followers.”

Wellesley's movements in this campaign have been described as complicated, though skilful. Skilful indeed they were, following every manœuvre of the enemy, yet a study of the map and of the British general's correspondence shows that his movements were exceedingly simple until after the battle of Assaye, when it becomes more difficult to follow them.

On August 26th he wrote to Colonel Murray : “ Since the beginning of the war, Colonel Stevenson has been exposed, single-handed, to the united armies of Sindhia and the Raja of Berar. Not a Maratha horseman has been able to show himself in the Nizam's territories, and Colonel Stevenson on the 23rd played the Maratha trick upon them, by cutting off some of their supplies.

Nevertheless the Maratha chiefs, taking advantage of Stevenson's absence to the east, entered the Nizam's territories, with their horse only, on 24th August by the Ajanta Ghaut, and spread their Pindaris over the country, concentrating their main force in the direction of Jalna. Wellesley now advanced to Aurungabad, and thence moved south to the Godavari, and kept along that river in order to prevent the enemy from crossing it, and carrying out their declared intention of marching on Hyderabad, which lay some 250 miles to the south-east.

Stevenson, advancing from Jafarabad, stormed and took the fort of Jalna on September 2nd, and during the next few days made night attacks on several of the enemy's camps, and forced him to retire in a northerly direction. Wellesley at the same time moved northwards, and checked the enemy's movement to the south, forcing him towards

been scattered to the four winds, whilst the victories of General Lake in the north had made themselves felt in this part of India also. Already the chieftains began to enquire concerning terms of peace. But the British Commander pursued his way relentlessly towards his goal. He would be satisfied with nothing less than the complete destruction of the hostile power. There still remained one stronghold to subdue, and upon this the march of the victorious army was directed.

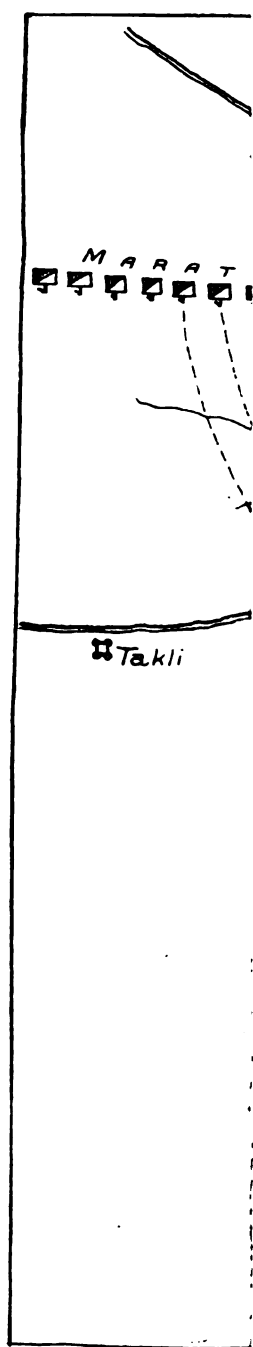
North-west of Ellichpur, crowning one of the highest peaks of the Satpura range, stands the great fortress of Gawilgarh, the enceinte of which can on a clear day be plainly distinguished from a distance of many miles.

To this fortress there are several approaches. Some three miles from Ellichpur the road to the north-west splits into two branches, both of which lead to Gawilgarh—one, a somewhat circuitous way, through the villages of Dhamangaon and Mota; the other by way of the hamlets of Deogaon and Imlibagh, the path entering the hills through the valley of the Chandrabagha river, a considerable stream in the rainy season, but a dry, stony water-course during the greater part of the year.

There is a third and circuitous road which, winding up the mountains for sixteen miles due north to Ghatang, turns abruptly to the west, and, passing through dense forest for another sixteen miles, emerges on to the plateau north of Gawilgarh. It is probable that this was the route taken by Stevenson, who was detached to attack the fort from the north, whilst Wellesley himself advanced by way of Deogaon and Imlibagh, disposing his force about the southern face of the hill to prevent the enemy from escaping.

On the 6th December the villages of Dhamangaon and Deogaon were cleared of the enemy, whose advanced posts were driven into the fort, the following account of which is to be found in the general's official despatch:—"The fort of Gawilgarh is situated in a range of mountains between the sources of the rivers Purna and Tapti. It stands on a lofty mountain in this range, and consists of one complete inner fort, which fronts to the south, where the rock is most steep; and an outer fort which covers the inner to the north-west and north. This outer fort has a third wall, which covers the approach to it from the north by the village of Labada. All these walls are strongly built, and fortified by ramparts and towers.

The communications with the fort are through three gates; one to the south with the inner fort; one to the north-west with the outer fort; and one to the north with the third wall. The ascent to the first is very long and steep, and is practicable only for men; that to the second is by a road used for the common communications of the garrison with the countries to the southward; but the road passes round the west side of the fort, and is exposed for a great distance to its fire: it is so narrow as to make it impracticable to approach regularly by it, and the rock is scarped on each side. This road also leads no farther than to the gate. The communication with the northern gate is direct from the village of Labada, and here the ground is level with that of the fort; but the road to Labada leads through the mountains for about 30 miles from Ellichpur; and it was obvious that the labour of moving ordnance and stores to Labada would be very great."





Nevertheless, by dint of the great exertions of the troops, Stevenson's force managed to drag some of their guns through the forest to Labada, where batteries were erected. The difficulties to be overcome in this undertaking, which occupied five days, and the manner in which those difficulties were met, can be understood from an anecdote of Colonel Welsh, who relates:—"We had been one night working very hard at a battery half way up the hill, and afterwards cleared a road up to it, but no power we possessed could move our iron battering guns above a few hundred yards from the bottom, so steep and rugged was the ascent. I was just relieved from working by a fresh party, and enjoying a few moments' rest on some clean straw, when the officer commanding the working party came up to Colonel Wallace, and reported that it was impossible to get the heavy guns up to the battery. The Colonel, who was Brigadier of the trenches, exclaimed,—"Impossible! hoot mon! it must be done! I've got the order in my pocket!" By the evening of the 14th December a practicable breach was made, and next morning the outer wall was carried by the 94th regiment and the native corps. The wall of the inner fort was then escalated by the light companies of the 94th, who opened the gates for their comrades, and in spite of the desperate efforts of the garrison, consisting of Rajputs and Beni Sing's Infantry, who made a determined resistance, the stronghold was soon in the hands of the British. Great numbers of the enemy were slain, including Beni Singh, whose body was found under a heap of dead at the gate.

In attempting to escape from the north-west gate during the assault, a body of the enemy was met by a detachment of the 78th and 10th regiments under Colonel Chalmers, who had been sent to co-operate with Stevenson, and arrived at this moment.

Thus every way of egress was barred, for the southern gate was covered by Wellesley's brass guns and the remainder of his force. Beni Sing had directed that his wives and daughters were to be slaughtered, so that they should not fall into the enemy's hands, but the work of assassination was not fully carried out, owing either to the humanity or carelessness of those to whom the performance of the deed was entrusted. Only three of the unfortunate women were killed, and a few were slightly wounded. The British loss amounted to one officer (Lieutenant Young of the 74th) and 13 men killed, and 2 officers and 110 men wounded.

The turreted walls of the fort of Gawilgarh are still in an excellent state of preservation, whilst about a dozen guns which formed its armament remain to this day, lying among the rank undergrowth within the walls.

The fort is abandoned and uninhabited save for a few families residing in some squalid huts just within the northern gate, who are perhaps descendants of those who so bravely defended it 97 years ago.

This brilliant enterprise brought the war to a speedy conclusion. On the fall of this place which had hitherto been deemed impregnable, the Raja of Berar at once sued for peace, which was concluded at Deogaon on December 17th, 1803. By the terms of this treaty, certain territories were ceded to the British and their allies, whilst the Bhonsla engaged "never to take or retain in his service any

Frenchman, or the subject of any other European or American Power, the Government of which may be at war with the British Government; or any British subject, whether European or Indian, without the consent of the British Government."

The submission of the Raja was soon followed by that of his ally Sindhia, with whom a similar treaty was concluded at Anjangaon a fortnight later.

On his return march to Poona the British General was fully occupied with the settlement of the country that had formed the theatre of the recent operations. Amongst other undertakings was that of the dispersal of a body of freebooters at Munkaisir, near Ahmednagar, largely composed of the garrison who had been allowed to escape when that place was taken. This expedition was completely successful, and resulted in the dispersal of the bandits, and the capture of all their baggage, containing immense plunder and a number of guns.

Having completed his work in the Deccan, Wellesley arrived in Poona on the 27th February 1804, thus bringing to a conclusion an enterprise that had been so productive of important results to the British Empire, and of glory to the British arms. The close of this campaign marked an era in the progress of the British Empire in India. It signalled the commencement of the disintegration of the Maratha power, and of the policy of establishing protectorates over foreign states, some of which were subsequently absorbed under British Government.

The Governor-General was, on his return to England, subjected to some criticism on account of the so-called aggressive policy which characterised his term of office. He was censured by certain of those narrow-minded politicians (whose counterparts may be found to-day) whose mental horizon was limited by their own personal views and interests or by those of their party, whilst the general was in some measure blamed by them for the part he had played in furthering his brother's policy.

But the consensus of public opinion was not in favour of such purblind cavillers. And we, in the bright light cast by a hundred years of history and a century of progress in the policy they inaugurated (even were such illumination necessary), can rightly judge of the great qualities of the statesman and of the soldier, and of the immeasurable and lasting services they performed for their country and for mankind. The perspective lent by time enables us to view things broadly, with a due regard for the proportion of events, and for their effect upon succeeding generations.

A contemplation of this peaceful and prosperous land, where no clash of arms has resounded for many decades; where the fort contained in every village, now no longer required, is mouldering into dust, is alone sufficient evidence to prove the righteousness of the policy that led to the overthrow of Maratha power, and to the eventual establishment of a permanent peace under the beneficent rule of the British Government.

The elimination of baneful states, the destruction of harmful and effete politics which constitute in themselves a danger to mankind and a barrier to the progress of the human race are objects in themselves sufficient to justify measures such as those which led to the gradual building-up of our Empire in the East, and will most assuredly be the

cause of the construction and consolidation of other Empires, in other parts of the world, and in future times.

#### COMMENTS ON THE OPERATIONS.

At the commencement of the foregoing narrative it was observed that valuable lessons are to be drawn from a study of the history of other times than our own, and it may not be unprofitable to briefly indicate some of those lessons in the present instance, and to deduce from the campaign that has been described some examples which may serve to illustrate the truth of the saying that history repeats itself.

Those who have carefully studied the course of Wellesley's operations, and have followed on the map the progress of the British army step by step from victory to victory until the end came in the complete overthrow of the enemy, cannot fail to have perceived that the main cause of success consisted in the attention paid to detail by the British commander. A perusal of his despatches and correspondence, written during the war, will reveal the fact that no matter, however trivial, escaped his notice, that every care possible was taken both as regards the details of supply and transport, and information of the enemy's movements, and measures to frustrate those movements. Attention to detail, combined with a masterly strategy and skilful tactics adapted to the circumstances of the moment, is a characteristic of all great commanders. To leave undone or unthought of no matter, however small, which may contribute to success, to neglect no precaution, however trivial, that may tend to obviate failure, is to ensure the attainment of one's object if such attainment be possible. And just as success in war, as in other affairs, apart from the element of chance, is due to such attention to detail, so in the history of all campaigns, failure and disaster may generally be traced to its neglect.

The main features of the operations that have been described consist in the utilisation by the British General of the natural obstacles that offered themselves, *vis.*, mountains and rivers.

This we see at every turn whether such obstacles are made use of to protect the army from the raids of the myriad Maratha horse, or to cover the approach of convoys, or whether they are taken advantage of to frustrate the manœuvres of the enemy, and prevent his predatory incursions into the territory of the allies.

Thus the British commander made use of the impediment offered to the enemy by the river Godavery in flood, which he well knew the Marathas were afraid to cross, whilst he could pass his army to and fro across the stream by means of the boats he was careful to provide. The use he made of this river, both as an obstacle and as an advanced base, forms one of the most prominent features of the campaign.

Again, he took full advantage of the Ajanta hills, as is evidenced by his marches and countermarches subsequent to the battle of Assaye, when the few passes that existed through the mountain range facilitated the operations undertaken for the defence of the Nizam's Dominions. The skilful employment of the two forces at his disposal, from Ahmednagar to Argaum, from a strategical point of view, is worthy of note, when, as Wellesley himself described it, he was "like a man who fights with one hand, and defends himself with the



relative to the roads to the flanks and front, where and in what quantity water is procurable; this is the main object of enquiry, unless where Ghauts are to be passed, or rivers forded; the latter, however, rarely occurs. After the camp has been pitched and the men been refreshed, the officers of Pioneers examine the adjoining roads, and take care that a passage to the front and one to each flank are prepared, at least for the distance of one mile."

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## SOME FOREIGN ARTICLES OF SPECIAL INTEREST.

### RECONNAISSANCE OF SHUGNAN IN 1894.

TRANSLATED FROM THE RUSSIAN BY MAJOR E. J. MEDLEY, 17TH  
BENGAL LANCERS.

As far as I have been able to discover no Englishman has ever yet visited the valley of the Shakh-Dara, and not many Russians. In fact the following is the only account of that valley which I have come across in the course of a somewhat extensive study of the literature relating to the Pamirs. It appeared in the "Turkestan Gazette" in 1896, and so far as my information goes the report is still quite up to date.

That our knowledge of this particular valley is not what it should be may be surmised from a comparison of the best English map of the Pamirs, *viz.*, that published by the Royal Geographical Society under the direction of Lord Curzon, with this reconnaissance report.

I was informed by an officer of the Turkestan branch of the Russian General Staff that their map of the Pamirs is kept secret. It is one of the very very few Russian maps that is labelled so, and seeing how very wide of the mark our best English map is, at any rate as regards the Shakh-Dara valley, it is hardly to be wondered at that the Russian Staff prefers to keep its map of the Pamirs secret.

#### I.

On Sunday, the 9th July 1894, there was great rejoicing at the Pamir Post. The garrison, consisting of two non-permanent detachments, together with representatives of the small Kirghiz population of the Pamirs was welcoming General Yonof, who had arrived at the post with his staff somewhat in advance of the third, the reserve detachment which, together with the other two, was to give evidence in the course of the summer of our firm resolve to occupy the Pamirs and defend its population from the raids and seizures of its neighbours.

If the arrival of an officer or a caravan is an important event in the dull, commonplace life of the garrison of the Pamir post, it may be easily realised that the usual daily routine on the present occasion was altogether upset, and that for several days high holiday reigned at the post.

Remembrances, letters, and parcels from those near and dear to us gave such food for reflection, while the arrival on the Pamirs of the Commander of the detachments led us to hope that we should not be sitting for ever in the fort, but that possibly a campaign was in store for us.

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Our expectations were, at least for some of us, soon fulfilled. It was decided to send two reconnoitring parties into the province of Shugnan, in order to defend the inhabitants of that Khanship from the raids of the Afghans, who although they had crossed over to the left bank of the Panja river to the fort of Kila-i-Bar-Panja, yet might at any moment reappear on the right bank again; and also into the valleys of the \*Gunt and Shakh-Dara, *i.e.*, into parts which since the Anglo-Russian agreement of 1872-73 had come under the Russian sphere of influence.

Summer was drawing to a close, and in Shugnan the inhabitants would be so soon cutting their crops. The time then was approaching when it would be most likely that the Afghans would make an attempt to cross the river to collect revenue from the Shugnis. In order to forestall them it would be necessary for the reconnoitring parties to hasten, and accordingly on the 19th July the two parties, each consisting of three officers, 12 foot soldiers, and 20 cossacks, together with a few Jigits as guides, started from the Pamir post, with the good wishes of those left behind.

Notwithstanding the fact that the morning was cloudy and that it made several attempts to rain, all those who were not coming with the reconnoitring parties, including even our one lady, Mrs. Skerski, saw us on our way as far as the ford across the Murghabi river, which is about ten versts below the post.

We started exactly at 8 A.M., and after going for 1½ hours we reached the crossing place. From want of other means of crossing, except two small sailing boats, and for want of wood with which a bridge might have been built, the only way of crossing the Murghabi was by fording; the heaviest and bulkiest packages, and all those to whom a wetting might have been dangerous, were sent across on camels, which had been specially collected at the ford for the purpose.

In autumn and winter the Murghab contains so little water that it can be crossed without difficulty at any place. Now, however, on account of the thawing of the glaciers, which form the source of this river, the water was fairly deep (it was above the horses' girths), and the current swift, consequently crossing was by no means easy, and moreover involved an enormous waste of time and strength, besides being attended with some loss; several bags of rations and forage were soaked through, also a box of ammunition, a gun, and several other things.

The infantry was sent across partly on pack horses, and partly behind the Cossacks on their horses, which latter circumstance gave rise to many mild jokes on the part of the on-lookers.

This was my third tour of service on the Pamirs, and every time we had to cross a river the same picture presented itself: until I wondered why our Turkestan troops are not supplied with some means of crossing mountain streams which they are constantly being called upon to do; folding sailing boats or pontoons, which could be carried on pack animals, bridges that will take to pieces, adapted for crossing such

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\* Ghund in R. G. S. Map of Pamirs.

streams, or something of this sort? To say nothing of the gain to Government in the fewer losses that would be incurred in property, arms, and ammunition, or the enormous amount of time and strength of the men that would be saved, some proper means of crossing rivers would preserve the men's health, for a bath in the cold water of a mountain torrent, with no means of changing the clothing or footgear until the stage is reached, and sometimes only at nightfall, cannot but be most prejudicial to the health of the troops.

On this occasion it took us four hours of hard work to accomplish the passage of the Murghab, with much expenditure of strength and the soaking of a good many of the things, and then we continued the march along the left bank of the river, which was as bare, deserted and uninhabited as the right bank.

Pamir scenery is remarkably monotonous and melancholy. Low hills, softly outlined against the sky, surrounding broad river valleys, absolutely bare and lifeless, are not calculated to impress the traveller with any idea of grandeur, such as is experienced in the Alai valley for instance. What might perhaps impress one is the height of the valleys above sea level, but this is not actually visible, it can only be imagined, or felt, and this too only when the difficulty of breathing, headache, bleeding from the nose, sickness, etc., make one realise the height at which one is travelling.

After passing the tombs of Shah Jehan, situated on the right bank of the river, the only buildings in the whole of the Pamirs, the road makes a sharp bend to the left, and after rising on to a small plateau, on which is another group of nameless graves, one descends into the valley of the river Kara-Su, a tributary of the Murghab, in the channel of which there is a small plain, covered with stunted willow bushes. From the Trans-Alai crest, which separates the Pamirs from Ferghana and the Alai up to the pass of Koi-Tezek, the boundary of Shugnan, *i.e.*, for a distance of about 400 versts, this is the only spot where any attempt at vegetation is to be found, and the eyes of the traveller involuntarily rest with pleasure on these stunted bushes, on which in any other part of the world he would not even bestow a single glance.

After crossing to the steep left bank of the Kara-Su, which has excavated for itself a channel in the hard conglomerate soil in some places attaining a thickness of from 50 to 70 feet, the road follows an almost flat expanse right up to the mouth of the Boz-Jilga stream, where not long ago was erected a "Rawat," and where travellers usually halt for the night.

This Rawat (rest-house) is in the form of a four cornered room with mud walls, and a mud roof, for wood there is none.

At this place there had been erected two Yurtas, which proved most serviceable, for it came on to rain during the night, although it is not supposed to rain on the Pamirs for more than eight or ten days in the year.

Next day both parties started at daybreak, and marched down the valley of the Alichur to the camping ground of Chatir Tash, after crossing the Neza-Tash pass, which is so broad and level that one might easily drive over it.

The road keeps along the valley the whole way, flanked on either side by low hills, and to the accompaniment of the usual Pamir view. At the entrance to the Alichur valley however a rather striking view is seen. The whole valley is as visible as the palm of one's hand, and in the middle of it appears Chatir Tash (stone tent), looking like a huge "Ram's forehead," though very like a tent at a distance, and recalling the times when it withstood the solid mass of ice moving slowly down the valley, which strove in vain to overturn this giant stone.

In the valley of the Alichur there is almost always a wind blowing, and invariably up the valley.

This wind we experienced, and after our 48 verst march it was decidedly unpleasant. Notwithstanding the fact that the infantry took it in turns to ride on the pack horses, and that they carried nothing on their persons but their rifles and cartridges, they only reached the camping ground very late in the evening, and we had in front of us next day a 30 verst march, and being in a hurry were unable to make a day's halt anywhere.

We halted for the night about five versts beyond Chatir Tash, in a place somewhat swampy, and covered with an abundance of good grass.

The valley of the Alichur is generally noted for its excellent grazing, but notwithstanding that, it is not much frequented by the nomads, and the reason is that they are afraid of the Afghans—who in 1891 and 1892 established during the summer months a post at the east end of the Yeshil Kul, near Soma Tash, where in 1892 occurred the bloody conflict between us and the Afghans, which put an end once for all to the raids of the Afghans into our territory and to their habit of collecting revenue from our nomad subjects on the Pamirs.

At the present time owing to the reconnaissance parties going into Shugnan, the nomads had come into the Alichur valley in some numbers.

In consequence of this we were able to get milk, cheese, and other similar supplies in any quantity. Better even than this was however the circumstance that we were here enabled to pass the night in some really good Yurtas, which sheltered us from the wind and the rain. The temperature too sank to \*8½ (Réaumur) before morning, which made the Yurtas still more appreciated.

## II.

Next day on the 21st July we started at a quarter past 7 in the morning, leaving at Chatir Tash as we had also done at the previous stage a post of three cossacks to bring on the mails.

The road runs along the left bank of the Alichur river close to the cliff, now and again rising to pass over a side nullah. After passing the mouth of the Bash Gumbaz stream, which comes down from the pass of the same name, and falls into the Alichur river, the road runs past one of the Rawats of Abdullah Khan. This Rawat is in a very fair state of preservation, notwithstanding the fact that it has been in existence for some 300 years, without any repairs.

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\*14° Fahrenheit.

At 4 o'clock a west wind sprang up and we were not sorry to see near the mouth of the ravine and stream of Mukur Shegehbet the Rawat, near which had been pitched for us some Yurtas. This Rawat has only recently been built, and standing as it does on a high bank it is visible from a long way off.

The soil here is full of saltpetre, and vegetation is consequently only found along the banks of the stream.

While waiting the arrival of our baggage, which generally reached camp about two hours after us, we employed our time in catching fish.

In this place in 1891 there was a Chinese post, which had left behind it a memento in the shape of a good deal of fuel, which had been collected for it by the local authorities—needless to say without payment.

Such an amount must have been collected that notwithstanding the fact that in 1892 our party on its way to the Yeshil Kul had halted here, and that also the passing Kirghiz had made free with this fuel, there was still at the time of our visit enough to supply not only the wants of our whole party, but also those of the Cossack post we dropped there to pass the mails along. This action on the part of the Chinese was highly commendable, for it is not easy when marching, especially if the weather is at all unpleasant, to arrange for fuel.

The next day we started early, as from this point our information concerning the road was of the vaguest.

From here the road makes a sharp turn to the left and leaves the valley of the Alichur.

Although it is possible to reach the valley of the Gunt river from here direct, by following along the bank of the Yeshil Kul, still owing to the bad state of the track along the lake, and also in the upper reaches of the river Gunt itself, which flows out of the west end of the lake, it is usual for travellers to take a longer but easier road across the pass of Koi-Tezek *via* the valley of the Toguz-Bulak, a tributary of the Gunt. After crossing one of the mountain spurs running down on the left bank of the Alichur, and passing several small lakes, we arrived at the salt lake of Tuz-Kul, and halted there for a few hours.

Here we were met by two Shugnis, sent by the inhabitants of Shakh-Dara, to request us to protect them from the raids of the Afghans. The poor clothing worn by these Shugnis, which was no better than what our ordinary Jigits were clothed in, made us think we had in front of us only poor Tajiks, when to our surprise we found out that one of the messengers was no less a person than Aziz Khan, the heir to the late ruler of Shakh-Dara, who had been put to death by Shah Abdur Rahim of Shugnan.

In Shugnan there are no "castes", and the heirs of the so-called "Shahs" differ in no respect from the ordinary populace, with whom their poverty and their dress are alike. Of course there are exceptions to this rule, and later on I had the pleasure of meeting the heir to the throne of Shugnan itself, who in all respects was "every inch a king".

Aziz Khan proved to be a sympathetic, lively young fellow, with a good deal to say for himself.

At Tuz-Kul we made a long halt, during which our baggage caught us up and passed us, so that we had not so long to wait for it at the camping place.

Naturally we took advantage of the presence of Aziz Khan to find out as much about the road as we could, and he comforted us much by saying that the road to Shakh-Dara was an excellent one, and that the inhabitants of the place were anxiously looking forward to our arrival, for they dreaded the Afghans.

It was not long before we were convinced of the truth of these words, for scarcely had we set foot in the valley of the Shakh-Dara when the inhabitants proved their delight at seeing us by rendering us every possible sort of service: they brought us sheep and fuel, helped us in carrying the baggage over difficult bits of the road, helped us in mending the road, and in short made themselves generally useful. As for the state of the road in the Shakh-Dara valley it can only be called tolerable by people accustomed to it, to us who compared it with the roads on the Pamirs it seemed execrable.

By 2 P.M. we had crossed the Tagarkakt pass and had reached our camp for the night close to the Kryk Sheit Mazar. As there was still lots of daylight some of us amused ourselves in fishing in a small stream which comes down from the Koi-Tezek pass and falls into the lake of Bulun-Kul. Our baggage soon arrived and we were not long in settling ourselves comfortably into two Yurtas which had been previously pitched for us. Although it was now the end of July, *i.e.*, the hottest time of the year, at 9-30 P.M. it was only 10 degrees\* (Réaumur) of heat, while in the morning the thermometer registered only 7°.†

We started next morning at 6-50 in lovely weather. The road led through somewhat swampy ground, then crossed from one bank of the Koi-Tezek stream to the other, and gradually led by a gentle incline to the pass of that name, which is the boundary of Shugnan. At 10-10, *i.e.*, after marching for 2 hours 20 minutes, during which we had gone about 10 versts, we reached the top of the pass (14,000'). Though easily accessible in summer the Koi-Tezek is covered with snow during six months of the year, and then one can only move along the sides of the hills, or the road is closed altogether. On the top of the pass the road branches, the one on the right leads into the valley of the Toguz-Bulak stream, a tributary of the Gunt; while the left hand road leads into the Shakh-Dara.

At this point the two parties had to separate, and henceforth travel apart. Having separated the baggage, and taken leave of our comrades, we set out along the left road for the valley of the Shakh-Dara. After crossing three deep ravines, one of which is 1,000 feet

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\* 55° (F.).

† 48° (F.).

deep, and at the bottom of which flow three streams (Uch-Kul=three streams), which form the Tuguz-Bulak, the road emerges on the broad plateau of Kok-Bai, an undulating plain, surrounded on all sides by snowy mountains. The height of this plateau soon made itself felt, many of the party had bad headaches, and we were not sorry to find that the road soon took a downward bend along the bank of the stream of Kok-Bai-Chat, a source of the Shakh-Dara river.

The night was agreeably warm. At 7-15 the next morning we started again and began to rapidly descend the valley. The country round changed for the better, and began to assume a typical hilly character. Notwithstanding the fact that the road got worse and worse, and progress grew more and more difficult, this change in the character of the country was pleasing in the extreme, for we were all by now heartily sick of the monotonous and lifeless Pamir scenery.

As we descended and the road grew worse we began to come across the willow and the wild rose, and the herbage grew greener and quite different to the Pamir grass, where the low temperature and the want of oxygen in the air causes the latter to be poor and without nourishment.

Rather more than two versts above the junction of the stream of Kok-Bai-Chat with the river Matz which flows down from the pass of the same name in the Wakhan mountains, the road is absolutely murderous, and movement along it is not only difficult, but positively dangerous. One can only marvel at the skilful way in which the country ponies carrying men, or what is even worse bulky packages manage to get along these break neck paths. The only way to avoid a catastrophe is to let the pony go his own way.

As we scrambled along the cliffs, we came out on to a rock from where a sheer drop led down to the junction of the Kok-Bai-Chat and Matz, and here a perfectly glorious view met our eyes. In the distance were visible the peaks of the Wakhan mountains covered with their eternal snows, while in the foreground we saw spread out before us the broad valley of the river Jaushankus, a tributary of the Shakh-Dara, covered with grass and willow bushes. The contrast between the lifeless masses of snow and ice, with which the tops of the mountains were covered and the green harbage full of life in which the valley was clothed was so astonishing that we were fain to halt in silent admiration for long at such a glorious scene.

Among the mass of peaks of the Wakhan range two are especially distinct. These are called respectively the peak of the Tzar Pacificator (23,000) and the peak of the Empress Marie (20,000). These two magnificent peaks are close to each other, and being far higher than any of the other peaks form as it were the culminating point of the whole of the Wakhan range. As we advanced further we had many opportunities of admiring these peaks, which are visible from all the high ground on the right bank of the Shakh-Dara, as well as from many of the side nullahs on the left bank.



Frenchman, or the subject of any other European or American Power, the Government of which may be at war with the British Government; or any British subject, whether European or Indian, without the consent of the British Government."

The submission of the Raja was soon followed by that of his ally Sindhia, with whom a similar treaty was concluded at Anjangaon a fortnight later.

On his return march to Poona the British General was fully occupied with the settlement of the country that had formed the theatre of the recent operations. Amongst other undertakings was that of the dispersal of a body of freebooters at Munkaisir, near Ahmednagar, largely composed of the garrison who had been allowed to escape when that place was taken. This expedition was completely successful, and resulted in the dispersal of the bandits, and the capture of all their baggage, containing immense plunder and a number of guns.

Having completed his work in the Deccan, Wellesley arrived in Poona on the 27th February 1804, thus bringing to a conclusion an enterprise that had been so productive of important results to the British Empire, and of glory to the British arms. The close of this campaign marked an era in the progress of the British Empire in India. It signalled the commencement of the disintegration of the Maratha power, and of the policy of establishing protectorates over foreign states, some of which were subsequently absorbed under British Government.

The Governor-General was, on his return to England, subjected to some criticism on account of the so-called aggressive policy which characterised his term of office. He was censured by certain of those narrow-minded politicians (whose counterparts may be found to-day) whose mental horizon was limited by their own personal views and interests or by those of their party, whilst the general was in some measure blamed by them for the part he had played in furthering his brother's policy.

But the consensus of public opinion was not in favour of such purblind cavillers. And we, in the bright light cast by a hundred years of history and a century of progress in the policy they inaugurated (even were such illumination necessary), can rightly judge of the great qualities of the statesman and of the soldier, and of the immeasurable and lasting services they performed for their country and for mankind. The perspective lent by time enables us to view things broadly, with a due regard for the proportion of events, and for their effect upon succeeding generations.

A contemplation of this peaceful and prosperous land, where no clash of arms has resounded for many decades; where the fort contained in every village, now no longer required, is mouldering into dust, is alone sufficient evidence to prove the righteousness of the policy that led to the overthrow of Maratha power, and to the eventual establishment of a permanent peace under the beneficent rule of the British Government.

The elimination of baneful states, the destruction of harmful and effete politics which constitute in themselves a danger to mankind and a barrier to the progress of the human race are objects in themselves sufficient to justify measures such as those which led to the gradual building-up of our Empire in the East, and will most assuredly be the

cause of the construction and consolidation of other Empires, in other parts of the world, and in future times.

#### COMMENTS ON THE OPERATIONS.

At the commencement of the foregoing narrative it was observed that valuable lessons are to be drawn from a study of the history of other times than our own, and it may not be unprofitable to briefly indicate some of those lessons in the present instance, and to deduce from the campaign that has been described some examples which may serve to illustrate the truth of the saying that history repeats itself.

Those who have carefully studied the course of Wellesley's operations, and have followed on the map the progress of the British army step by step from victory to victory until the end came in the complete overthrow of the enemy, cannot fail to have perceived that the main cause of success consisted in the attention paid to detail by the British commander. A perusal of his despatches and correspondence, written during the war, will reveal the fact that no matter, however trivial, escaped his notice, that every care possible was taken both as regards the details of supply and transport, and information of the enemy's movements, and measures to frustrate those movements. Attention to detail, combined with a masterly strategy and skilful tactics adapted to the circumstances of the moment, is a characteristic of all great commanders. To leave undone or unthought of no matter, however small, which may contribute to success, to neglect no precaution, however trivial, that may tend to obviate failure, is to ensure the attainment of one's object if such attainment be possible. And just as success in war, as in other affairs, apart from the element of chance, is due to such attention to detail, so in the history of all campaigns, failure and disaster may generally be traced to its neglect.

The main features of the operations that have been described consist in the utilisation by the British General of the natural obstacles that offered themselves, *vis.*, mountains and rivers.

This we see at every turn whether such obstacles are made use of to protect the army from the raids of the myriad Maratha horse, or to cover the approach of convoys, or whether they are taken advantage of to frustrate the manœuvres of the enemy, and prevent his predatory incursions into the territory of the allies.

Thus the British commander made use of the impediment offered to the enemy by the river Godavery in flood, which he well knew the Marathas were afraid to cross, whilst he could pass his army to and fro across the stream by means of the boats he was careful to provide. The use he made of this river, both as an obstacle and as an advanced base, forms one of the most prominent features of the campaign.

Again, he took full advantage of the Ajanta hills, as is evidenced by his marches and countermarches subsequent to the battle of Assaye, when the few passes that existed through the mountain range facilitated the operations undertaken for the defence of the Nizam's Dominions. The skilful employment of the two forces at his disposal, from Ahmednagar to Argaum, from a strategical point of view, is worthy of note, when, as Wellesley himself described it, he was "like a man who fights with one hand, and defends himself with the

other," using Stevenson's or his own force for attack or defence, or combining the two armies as occasion arose.

With regard to tactics, they were doubtless simpler in those days when the battlefield was so limited in area. The difficulty of reconnoitring an enemy provided with a numerous mounted force is noteworthy, and has been experienced in our own time.

The swift decision to attack, especially necessary when dealing with an Asiatic or savage foe, followed by the crushing blow at Assaye, and the skilful use made on that occasion of the obstacle offered by the Kelna river in flood afford valuable lessons. Hesitation or retreat would probably have been followed by destruction, as was exemplified the following year when Monson's force was destroyed by Holkar on the Chambal river.

The action itself, when once it had commenced, was a soldiers' battle, the result depending entirely on hard fighting and on the valour of the troops. The great loss on the British side was due principally to a subordinate officer having exceeded his instructions, and having, where he should merely have held the enemy until an attack had developed on the other flank, become so desperately engaged that all the reserves and the cavalry had to be used up in extricating him. But for this error it is possible that the battle would have had more decisive results, and possibly it would not have been necessary to have fought again at Argaum. Of the latter action there is not much to be said. The enemy was disheartened by his previous defeat, and it was only necessary to attack him boldly and vigorously in order to ensure his flight. It was, however, an event of great importance, as the Marathas were then vanquished on their own territory and not merely in a state which they had invaded, as was the case at Assaye. It was thus proved to them that they could be followed into their own country and beaten there.

The siege of Gawilgarh was well conceived and skilfully executed, and exemplified the value of a turning movement in dealing with a mountain stronghold, whilst its fall had a great moral effect as it had hitherto been deemed impregnable. Indeed, one has only to behold its great grey walls crowning the rugged heights, and the difficulty of its approaches, to wonder how it could have been taken at all. But the British soldier is a marvellous man, as many strongholds in this country which have fallen before his irresistible assault bear witness to this day.

The difficulty, with a force composed principally of infantry, of coming to terms with an enemy whose army consisted in great part of horsemen, is evident throughout this war, and has been experienced again in most recent times. This lesson might have been learnt nearly a hundred years ago, although it is now spoken of as something new and unexpected. Finally there is the lesson (which our enemies would do well to take to heart and which we may profitably take as an example) of the valour of the British soldier, which is no less in our time than it was when the Highlanders fought so bravely at Assaye, and the 19th Light Dragoons scattered the Maratha horse like chaff before the wind. Without such valour, indeed, all the skill of commanders, all the examples of history, all theoretical knowledge of the art of war, however well applied, can avail but little on the day of battle.

## SOME FOREIGN ARTICLES OF SPECIAL INTEREST.

### RECONNAISSANCE OF SHUGNAN IN 1894.

TRANSLATED FROM THE RUSSIAN BY MAJOR E. J. MEDLEY, 17TH  
BENGAL LANCERS.

As far as I have been able to discover no Englishman has ever yet visited the valley of the Shakh-Dara, and not many Russians. In fact the following is the only account of that valley which I have come across in the course of a somewhat extensive study of the literature relating to the Pamirs. It appeared in the "Turkestan Gazette" in 1896, and so far as my information goes the report is still quite up to date.

That our knowledge of this particular valley is not what it should be may be surmised from a comparison of the best English map of the Pamirs, *viz.*, that published by the Royal Geographical Society under the direction of Lord Curzon, with this reconnaissance report.

I was informed by an officer of the Turkestan branch of the Russian General Staff that their map of the Pamirs is kept secret. It is one of the very very few Russian maps that is labelled so, and seeing how very wide of the mark our best English map is, at any rate as regards the Shakh-Dara valley, it is hardly to be wondered at that the Russian Staff prefers to keep its map of the Pamirs secret.

#### I.

On Sunday, the 9th July 1894, there was great rejoicing at the Pamir Post. The garrison, consisting of two non-permanent detachments, together with representatives of the small Kirghiz population of the Pamirs was welcoming General Yonof, who had arrived at the post with his staff somewhat in advance of the third, the reserve detachment which, together with the other two, was to give evidence in the course of the summer of our firm resolve to occupy the Pamirs and defend its population from the raids and seizures of its neighbours.

If the arrival of an officer or a caravan is an important event in the dull, commonplace life of the garrison of the Pamir post, it may be easily realised that the usual daily routine on the present occasion was altogether upset, and that for several days high holiday reigned at the post.

Remembrances, letters, and parcels from those near and dear to us gave such food for reflection, while the arrival on the Pamirs of the Commander of the detachments led us to hope that we should not be sitting for ever in the fort, but that possibly a campaign was in store for us.

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Our expectations were, at least for some of us, soon fulfilled. It was decided to send two reconnoitring parties into the province of Shugnan, in order to defend the inhabitants of that Khanship from the raids of the Afghans, who although they had crossed over to the left bank of the Panja river to the fort of Kila-i-Bar-Panja, yet might at any moment reappear on the right bank again; and also into the valleys of the \*Gunt and Shakh-Dara, *i.e.*, into parts which since the Anglo-Russian agreement of 1872-73 had come under the Russian sphere of influence.

Summer was drawing to a close, and in Shugnan the inhabitants would be so soon cutting their crops. The time then was approaching when it would be most likely that the Afghans would make an attempt to cross the river to collect revenue from the Shugnis. In order to forestall them it would be necessary for the reconnoitring parties to hasten, and accordingly on the 19th July the two parties, each consisting of three officers, 12 foot soldiers, and 20 cossacks, together with a few Jigits as guides, started from the Pamir post, with the good wishes of those left behind.

Notwithstanding the fact that the morning was cloudy and that it made several attempts to rain, all those who were not coming with the reconnoitring parties, including even our one lady, Mrs. Skerski, saw us on our way as far as the ford across the Murghabi river, which is about ten versts below the post.

We started exactly at 8 A.M., and after going for 1½ hours we reached the crossing place. From want of other means of crossing, except two small sailing boats, and for want of wood with which a bridge might have been built, the only way of crossing the Murghabi was by fording; the heaviest and bulkiest packages, and all those to whom a wetting might have been dangerous, were sent across on camels, which had been specially collected at the ford for the purpose.

In autumn and winter the Murghab contains so little water that it can be crossed without difficulty at any place. Now, however, on account of the thawing of the glaciers, which form the source of this river, the water was fairly deep (it was above the horses' girths), and the current swift, consequently crossing was by no means easy, and moreover involved an enormous waste of time and strength, besides being attended with some loss; several bags of rations and forage were soaked through, also a box of ammunition, a gun, and several other things.

The infantry was sent across partly on pack horses, and partly behind the Cossacks on their horses, which latter circumstance gave rise to many mild jokes on the part of the on-lookers.

This was my third tour of service on the Pamirs, and every time we had to cross a river the same picture presented itself: until I wondered why our Turkestan troops are not supplied with some means of crossing mountain streams which they are constantly being called upon to do; folding sailing boats or pontoons, which could be carried on pack animals, bridges that will take to pieces, adapted for crossing such

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\* Ghund in R. G. S. Map of Pamirs.

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On this occasion it took us four hours of hard work to accomplish the passage of the Murghab, with much expenditure of strength and the soaking of a good many of the things, and then we continued the march along the left bank of the river, which was as bare, deserted and uninhabited as the right bank.

Pamir scenery is remarkably monotonous and melancholy. Low hills, softly outlined against the sky, surrounding broad river valleys, absolutely bare and lifeless, are not calculated to impress the traveller with any idea of grandeur, such as is experienced in the Alai valley for instance. What might perhaps impress one is the height of the valleys above sea level, but this is not actually visible, it can only be imagined, or felt, and this too only when the difficulty of breathing, headache, bleeding from the nose, sickness, etc., make one realise the height at which one is travelling.

After passing the tombs of Shah Jehan, situated on the right bank of the river, the only buildings in the whole of the Pamirs, the road makes a sharp bend to the left, and after rising on to a small plateau, on which is another group of nameless graves, one descends into the valley of the river Kara-Su, a tributary of the Murghab, in the channel of which there is a small plain, covered with stunted willow bushes. From the Trans-Alai crest, which separates the Pamirs from Ferghana and the Alai up to the pass of Koi-Tezek, the boundary of Shugnan, *i.e.*, for a distance of about 400 versts, this is the only spot where any attempt at vegetation is to be found, and the eyes of the traveller involuntarily rest with pleasure on these stunted bushes, on which in any other part of the world he would not even bestow a single glance.

After crossing to the steep left bank of the Kara-Su, which has excavated for itself a channel in the hard conglomerate soil in some places attaining a thickness of from 50 to 70 feet, the road follows an almost flat expanse right up to the mouth of the Boz-Jilga stream, where not long ago was erected a "Rawat," and where travellers usually halt for the night.

This Rawat (rest-house) is in the form of a four cornered room with mud walls, and a mud roof, for wood there is none.

At this place there had been erected two Yurtas, which proved most serviceable, for it came on to rain during the night, although it is not supposed to rain on the Pamirs for more than eight or ten days in the year.

Next day both parties started at daybreak, and marched down the valley of the Alichur to the camping ground of Chatir Tash, after crossing the Neza-Tash pass, which is so broad and level that one might easily drive over it.

The road keeps along the valley the whole way, flanked on either side by low hills, and to the accompaniment of the usual Pamir view. At the entrance to the Alichur valley however a rather striking view is seen. The whole valley is as visible as the palm of one's hand, and in the middle of it appears Chatir Tash (stone tent), looking like a huge "Ram's forehead," though very like a tent at a distance, and recalling the times when it withstood the solid mass of ice moving slowly down the valley, which strove in vain to overturn this giant stone.

In the valley of the Alichur there is almost always a wind blowing, and invariably up the valley.

This wind we experienced, and after our 48 verst march it was decidedly unpleasant. Notwithstanding the fact that the infantry took it in turns to ride on the pack horses, and that they carried nothing on their persons but their rifles and cartridges, they only reached the camping ground very late in the evening, and we had in front of us next day a 30 verst march, and being in a hurry were unable to make a day's halt anywhere.

We halted for the night about five versts beyond Chatir Tash, in a place somewhat swampy, and covered with an abundance of good grass.

The valley of the Alichur is generally noted for its excellent grazing, but notwithstanding that, it is not much frequented by the nomads, and the reason is that they are afraid of the Afghans—who in 1891 and 1892 established during the summer months a post at the east end of the Yeshil Kul, near Soma Tash, where in 1892 occurred the bloody conflict between us and the Afghans, which put an end once for all to the raids of the Afghans into our territory and to their habit of collecting revenue from our nomad subjects on the Pamirs.

At the present time owing to the reconnaissance parties going into Shugnan, the nomads had come into the Alichur valley in some numbers.

In consequence of this we were able to get milk, cheese, and other similar supplies in any quantity. Better even than this was however the circumstance that we were here enabled to pass the night in some really good Yurtas, which sheltered us from the wind and the rain. The temperature too sank to \*8½ (Réaumur) before morning, which made the Yurtas still more appreciated.

## II.

Next day on the 21st July we started at a quarter past 7 in the morning, leaving at Chatir Tash as we had also done at the previous stage a post of three cossacks to bring on the mails.

The road runs along the left bank of the Alichur river close to the cliff, now and again rising to pass over a side nullah. After passing the mouth of the Bash Gumbaz stream, which comes down from the pass of the same name, and falls into the Alichur river, the road runs past one of the Rawats of Abdullah Khan. This Rawat is in a very fair state of preservation, notwithstanding the fact that it has been in existence for some 300 years, without any repairs.

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\*14° Fahrenheit.

descended to this ditch. To the right and left the Shakh-Dara was visible, looking like a thin streak of silver between its lofty banks, while behind us was the still narrower nullah of the Bajan-Dara, behind which were visible snowy peaks. The rocky masses on both banks are so close together here that they seem to overpower the traveller with their vastness, and make him feel how infinitely small and insignificant he is amid these gigantic natural features. Instinctively one wishes to hurry on through these massive gorges so as to reach the open again, but on this occasion we were unable to gratify our wish. Behind us there was no water or forage, while before us lay a desperate climb up a rocky precipice, and our people and animals were absolutely done up after the day's march, so whether we liked it or not, here we were and here we must halt the night. Moreover, the cossacks and the leading animals did not reach the top of the final descent till nearly 6 P.M.

Here we received a letter from the Commander of the Afghan detachment which had come out to meet us, and had halted at Rosh Kala, not very far from our camp. In flowery Persian he welcomed us to Shugnan, and apologised for not having been able to meet us in a befitting manner on the frontier, which was due, he said, to the fact that he had received news of our coming too late to allow of his doing so. Later on the reader will have an opportunity of judging how far these intentions were founded on fact, and how they turned out to be mere phrases.

Our baggage was barely all in when night wrapped us round with a black pall, and the stars shone out brightly, while a cold wind blew down on us from the snowy peaks of the Wakhan mountains. On the dark blue horizon appeared the new moon, lighting up the dark rocks and the tops of the trees, and silvering the streak of the river, and then it passed behind the hill under the shadow of which was our camp.

The tired men soon finished dinner and dropped off to sleep. A perfect silence reigned over the camp, broken only by the rushing water. On account of the proximity of the Afghan camp and the disadvantages of our camp, a few infantry were sent on to hold the top of the path, the only place by which our camp could be got at, for according to the Tajiks the surrounding hills were absolutely inaccessible.

## V.

Next morning, 28th July, a day to be for ever remembered by us all, we moved on at 7 A.M.

The fording of the river Bajan-Dara was not difficult, for in the morning mountain streams usually contain but little water. On the other hand, however, the ascent of the hill on the left bank of the Shakh-Dara, about 1,000 feet high, and the march along the narrow rocky gorge, which was strewn with sharp rocks, was fearfully difficult, especially as all the baggage had to be carried by men, and everyone had to walk. The first half of this ascent was not so difficult as to make it absolutely impossible for the baggage to be carried on the ponies, but the second half, composed as it was of bare rock, on which in many



places steps were cut for comfort, or rather to enable one to get along at all—compelled the carrying by men of the baggage. Thanks to the fact that the men were all fresh, and also that the number of Tajiks who had come out to help us had largely increased the ascent was soon accomplished, and without the men being quite done up, which in view of possible contingencies was a matter that had to be kept constantly in mind.

Movement along the gorge amid a mass of sharp rocks, and by a narrow path which kept losing itself among the stones, was excessively unpleasant; the gorge however soon widened and we emerged on to a broad valley, from whence we could see the Kishlak of Sendip, the abode of our eminent fellow traveller, Aziz Khan.

It was a lovely summer morning. The sun brilliantly lighted up the sides of the mountains, on the uniform grey colour of which were here and there visible the huts of the Kishlak, picturesquely situated on the slopes and surrounded by masses of green cultivation.

All round us was the most absolute silence, although we knew that in the Kishlak Aziz Khan's family and brother were then living.

Owing to the proximity of the Afghans, it was decided that we should all march with the baggage, and while waiting for the latter to come up, I busied myself with a thorough inspection through my glasses of the Kishlak and the surrounding country.

The Kishlaks of the Shugnis are generally formed of only a few huts, which are widely scattered, each of which is surrounded by fields belonging to the hut. Each family, which is usually composed of the father, the mother, and several married brothers lives in its own separate farm. The huts of the Tajiks are made of stone cemented together with mortar, and are more like cattle sheds than dwellings of human beings. This resemblance is further enhanced by the fact that there are no windows in the huts, while the doors are almost always very small, rudely hewn out of planks. Light is obtained through a four-cornered hole in the roof, which can be closed by a shield; this hole serves the further purpose of an outlet for the smoke from the hearth, which is made by one of the walls of the hut. This hole is called the "ruuz." In consequence of the absence of windows the Tajik huts are dark and damp, and leave much to be desired from a hygienic point of view. Furniture there is none, its place being taken by wide benches along the walls of the hut. On these benches the people sit, sleep, eat, drink, etc. The vast majority of the Tajik huts have not a very attractive appearance, although some, like Aziz Khan's hut, for instance, are elegantly furnished, with carved woodwork, smoothly plastered walls, adorned with numerous niches, which besides being ornamental serve for holding the plates, dishes, and other household goods.

Stables, cow houses, granaries, etc., are usually placed alongside the dwelling huts. One should not forget to mention, too, those very original buildings called "topkhanehs," in shape like a four-cornered tower, in which the inhabitants of the Kishlak used to take refuge in former days when attacked, and where they waited either for reinforce-

deep, and at the bottom of which flow three streams (Uch-Kul=three streams), which form the Tuguz-Bulak, the road emerges on the broad plateau of Kok-Bai, an undulating plain, surrounded on all sides by snowy mountains. The height of this plateau soon made itself felt, many of the party had bad headaches, and we were not sorry to find that the road soon took a downward bend along the bank of the stream of Kok-Bai-Chat, a source of the Shakh-Dara river.

The night was agreeably warm. At 7-15 the next morning we started again and began to rapidly descend the valley. The country round changed for the better, and began to assume a typical hilly character. Notwithstanding the fact that the road got worse and worse, and progress grew more and more difficult, this change in the character of the country was pleasing in the extreme, for we were all by now heartily sick of the monotonous and lifeless Pamir scenery.

As we descended and the road grew worse we began to come across the willow and the wild rose, and the herbage grew greener and quite different to the Pamir grass, where the low temperature and the want of oxygen in the air causes the latter to be poor and without nourishment.

Rather more than two versts above the junction of the stream of Kok-Bai-Chat with the river Matz which flows down from the pass of the same name in the Wakhan mountains, the road is absolutely murderous, and movement along it is not only difficult, but positively dangerous. One can only marvel at the skilful way in which the country ponies carrying men, or what is even worse bulky packages manage to get along these break neck paths. The only way to avoid a catastrophe is to let the pony go his own way.

As we scrambled along the cliffs, we came out on to a rock from where a sheer drop led down to the junction of the Kok-Bai-Chat and Matz, and here a perfectly glorious view met our eyes. In the distance were visible the peaks of the Wakhan mountains covered with their eternal snows, while in the foreground we saw spread out before us the broad valley of the river Jaushankus, a tributary of the Shakh-Dara, covered with grass and willow bushes. The contrast between the lifeless masses of snow and ice, with which the tops of the mountains were covered and the green herbage full of life in which the valley was clothed was so astonishing that we were fain to halt in silent admiration for long at such a glorious scene.

Among the mass of peaks of the Wakhan range two are especially distinct. These are called respectively the peak of the Tzar Pacificator (23,000) and the peak of the Empress Marie (20,000). These two magnificent peaks are close to each other, and being far higher than any of the other peaks form as it were the culminating point of the whole of the Wakhan range. As we advanced further we had many opportunities of admiring these peaks, which are visible from all the high ground on the right bank of the Shakh-Dara, as well as from many of the side nullahs on the left bank.

When we had sufficiently admired the snowy peaks we proceeded on our way, and after a few minutes reached the valley of the Jaushankus at the place called by the Kirghiz the "dep shi utun", i.e., "like a trough." The descent was very difficult: the path we were following was excessively steep, and covered with huge stones, which made progress slow. Further on, however, the road improved considerably. Here it crosses an almost perfectly flat meadow, covered with excellent grass, across which a carriage might drive just as it is.

Here we were met by a party of nine Tajiks, who having heard of our coming had come out to meet us. About midday we reached the Yurtas which had been pitched for us surrounded by a fairly large crowd of Tajiks of Shugnan and Kirghiz, the nomad inhabitants of this part of the world, the subjects of the well known Pamir Bai Kurban Datkhi.

Formerly in the days of the Khans, there were as many as forty to fifty kibitkas of these nomads in Shugnan, but now there are no more than seven, and even these prefer to keep as close as possible to the Pamir deserts, in order to flee when necessary from the Afghans, who make inroads into Shugnan up to the upper reaches of the Shakh-Dara from Wakhan, where they maintain a garrison in Kala-i-Bar Panja, the capital of the Khanship. Communication with Wakhan is maintained across the very difficult pass of Matz, which is covered with snow and glaciers, and in winter is absolutely closed for some four months of the year. The difficulty of communication has saved the Kirghiz from a closer neighbourhood with the Afghans, who only required from them the maintenance of a watch post, which was called upon to inform them of all that went on in that part of the country, and chiefly of the doings of the Russians on the Pamirs. Whether this post fulfilled its duties I am unable to say, but on our approach they all turned out to welcome us in the warmest manner.

We halted not far from the ruin of "Butenek-Kurgan," alongside which is a large burial ground; both these places are very ancient. In all probability this and other Kurgans which we came across later on were all used originally as fortifications by the Kirghiz against the Tajiks who used to raid into Shugnan.

In the time of the Khans or as they were then called "Shahs" such raids were so common that frequently it happened that the ruler himself formed gangs for the purpose. These raids were not looked upon as a crime, but were considered as something in the nature of war, and the participators in them were given to boasting of their successes, and were esteemed accordingly.

The stream, on the bank of which we had halted among some bushes, is formed by the junction of the Kok-Bai-Chat and the Matz, and is then called the Jaushankus. The meaning of the latter word is "here barley is sown." The valley of the Jaushankus, which flows into the Shakh-Dara, is here very broad, and level enough for the game of "baiga" to be indulged in. The valley here is surrounded by comparatively low hills, absolutely bare, and devoid of both grass and snow; its bed is somewhat swampy, and it is covered with excellent grass and willow bushes, the latter attaining a height of some five or six feet.

The further progress of the detachment down the Shakh-Dara valley was through more and more cultivated spots, with a comparatively dense population. Everywhere we came across cultivated fields, many of which had been burnt by the Afghans or trodden down wantonly in revenge for their owners having thrown in their lot with us. We also came across many houses that had been burnt down, and generally there were signs of the recent stay here of the Afghans.

The fort of Rosh Kala, near to which the detachment crossed to the right bank of the Shakh-Dara, is built on a high cliff. The southern face of this cliff, which overlooks the river, is not only perpendicular, but is even overhanging, and is some 300 feet above the surrounding country. From this side Rosh-Kala is absolutely impregnable. On the eastern and western sides also the approach is most difficult; but on the northern side, which faces the mountains on the right bank of the river, it appears more accessible, against this however must be set the fact that the walls here are massively built of stone, and their height is greater.

The rock on which stands the fort of Dosh-Kala was the place of punishment of the last of the autocratic rulers of Shakh-Dara, Mir Adam Bek, and his numerous adherents, who for so long maintained their independence against the ruler of Shugnan, Abdur Rahim Khan, by whose orders the unfortunate men were thrown from the top of the rock on to the stones below.

In Rosh-Kala there are large numbers of huts for men, horses, and stores. Hence the Afghans had been able to make themselves perfectly comfortable while besieging us, and if only we had been able to forestall them, there we could easily have held our own.

For miles the whole of the surrounding country is visible from this rock, and the kishlaks, laying picturesquely scattered along the hill-sides on both banks of the Shakh-Dara, look like little dolls' houses.

The nearer we approached to the mouth of the Shakh-Dara the more cultivated and populous became the country, and the easier became the road, and it was easy to see that the latter had been "made."

After the junction of the Gunt and Shakh-Dara the stream is called the Kharogh, which has however only a length of some 8—10 versts, and then it flows into the Wakhan river, and thus forms the "Ab-i-Panja."

The valley of the Kharogh is one long thickly cultivated field, the various portions of which belonging to various proprietors are separated from each other by small stone walls. In order to reach the right bank of the Kharogh, we had to cross the Gunt by a bridge which was some few hundred yards above the junction of the Gunt and Shakh-Dara streams.

Here we were joined by the Gunt reconnoitring party, and we camped together on a large plateau, in various small gardens, about 3—4 versts from the mouth of the Kharogh, where we stayed till 15th September, waiting for orders. The time was spent in making a

the surrounding countries by lofty, almost impassable mountains, and living on the confines of the uninhabited Pamirs, the Tajiks of Shugnan from this cause alone were prevented from intermarrying much with other races, while in addition their neighbours were not inclined to hold intercourse with them because of their being Shiahs, and heretics, and consequently very little better than dogs in their eyes.

Khudoyar was accompanied by a tall young, handsome, Jigit, dressed in a grey Afghan uniform coat with shining buttons, and armed with the curved Afghan sabre with steel hilt, suspended from the Afghan belt.

After passing the ruins of the Kishlak of Urang, lying near the mouth of the stream, which flows down from the pass of the same name, and which is better known to the Kirghiz by the name of 'Cheke,' we continued down the left bank of the Shakh-Dara, now along the bare rocks, overhanging the river, now through bushes of willow and birch, and now along the flat stony bed of the river, until at length we reached the old fort of Koi-Kuuat lying on the right bank of the Shakh-Dara; this fort was built, according to the local authorities, 700 years ago, by the Amir Koi-Kuuat, whose name it bears to this day. The site of the fort on the vertical cliff was well chosen, and its natural inaccessibility is enhanced by high stone walls, which gave effectual protection to those seeking refuge in it. At the present time there are a large number of huts inside the fort, in which Kurban-Datkha winters with his numerous progeny.

This is a remarkably pretty spot. The valley here opens out, and forms a wonderful plateau, covered with high bushes of willow and thick grass, in the midst of which we halted. It was a lovely summer morning, and notwithstanding the early hour the sun was so strong that we preferred to rest in the shade and from there to admire the scene. Our rest came to an end all too soon, and most unwillingly we continued our journey to Baba-Abdal-Mazar, where we were to halt for the night. The road soon crossed to the right bank of the Shakh-Dara, to get to which we had to go through a pretty deep ford, and then at about one verst before we reached our halting place we had to ford again across the stream of Baba-Abdal, which flows into the Shakh-Dara from the right. Here too the water was fairly deep, while the current was both swift and boisterous, and the bottom being covered with large stones the passage was even a dangerous one. We halted on the bank of the Shakh-Dara amid some bushes whose stems reached here a thickness of 3-4 inches. We were within sight of the tomb of the holy man Baba-Abdal, who is held in such respect by the inhabitants of Shakh-Dara that when they are passing by his tomb they invariably dismount and walk past.

The tomb is built on a height, and consequently is visible from a great distance. There is nothing remarkable about it. Outwardly it is hardly to be distinguished from the usual tomb or Mazar and consists of two rooms with a terrace. Over the roof hang on high masts bunches of yaks' tails, and bits of cloth, left there by worshippers.

A little below the tomb on the site of the hill are the ruins of a Kishlak, apparently deserted but a short time ago, for the woodwork in the ceilings of many of the huts was still intact, and inside were the remains of cooking utensils, etc.

We reached our night's halting place very early (quarter to 12), but we decided not to go on as our guides told us that the next place at which fodder for the animals was procurable was very far on.

This locality was absolutely unknown to us, consequently we were entirely dependent on our guides, all the more so perhaps that it was to their interest to get us as soon as possible to the point of junction of the Gunt and Shakh-Dara valleys, where the reconnoitring parties were to re-unit, for only then could the Tajiks count on immunity from the side of the Afghans.

The rest of the day I spent in examining the tomb, the ruins of the Kishlak and the defile of the Baba-Abdal, in which I discovered the remains of former irrigation channels; for a distance of some 3 miles these canals were either carried along natural embankments or else along the face of the solid rock. In the latter case the water was carried along wooden troughs which were either suspended to projections from above or else supported underneath by props sometimes as much as 20—30 feet long. It can easily be understood that such works must have required an enormous amount of time and trouble, and this the Tajiks were eminently fitted for, as I do not believe there is another such painstaking people on the face of the globe.

Besides industry, a quality inherent in all the Tajiks of Shugnan, one must also mention their love of a settled life and for the soil which they till and which but ill requites them for all their labour on it.

After passing the night near Baba-Abdal-Mazar the next morning at 6-45 we resumed our journey.

On this day, 26th July, it behoved us to do a not very long but excessively difficult march of only 21 versts to the first Shugni Kishlak on the Shakh-Dara called Seij, which is on the right bank of the river.

The difficulty consisted chiefly in our having to cross the river by fording four times during the march, and as the water was fairly deep to the difficulty was also added a fair amount of danger. At first the road goes along a terrace slightly inclined towards the river, but it soon after passes through a meadow covered with a thick jungle of willow bushes.

Next it steeply climbs a declivity, again goes through meadow, then into thick jungle and at four versts from Baba-Abdal-Mazar one finds oneself confronted with an absolutely perpendicular rock, which prevents further progress along the right bank. At this part both banks of the river are covered with a thick growth of willow. The river bed is here smooth and stoneless, and the water only came up to our stirrups. As we foresaw that the operation of fording would take

some time, we decided to wait till we had seen the most precious of our possessions across. Our wait would have been a somewhat monotonous one but for a mild excitement in the shape of one of the ponies, as it was coming down the steep path, which was carrying two boxes of ammunition and a case of liquor, going over the khud right into the river. By the exertions of the Tajiks one of the boxes of ammunition was rescued, but the other fell into a deep place and was lost. The box of liquor was recovered with difficulty as it floated for a little.

The fording took  $2\frac{1}{2}$  hours, and it was only at 10 A.M., *i.e.*,  $3\frac{1}{2}$  hours after we had left the last camp, that we were able to proceed, having up to that time done no more than four versts. After an hour's march we again had to ford to the right bank of the Shakh-Dara, which here divides into two branches thanks to which the water although deep, still not being so swift made fording easier. We again called a halt here in a thick jungle of poplars and willows.

At noon we resumed our march and in half an hour we had mounted so high above the river that the sound of its roar was no longer heard. The foot-path is here some 400 feet above the river, and goes up and down crossing many side ravines. On the left bank is visible the large nullah of Indich-Bashur, which is divided in two and behind which are visible the sharp pointed spurs of the Wakhan chain, covered with their perpetual snow, while at the foot a small stream flows into the Shakh-Dara. Immediately opposite the nullah of Indich-Bashur, on the right bank of the Shakh-Dara is a small kishlak, which the Tajiks told us had only been abandoned the previous year.

After passing by the nullah of Indich Bashur we came on to an almost level maidan, where we were met by some Tajiks bringing us a letter from the inhabitants of the villages in the lower part of the valley, who implored us to hasten. Further on the road again crosses several side nullahs and then rises on to a height: next it descends to the river and passes through a willow jungle so thick that one is forced to wind in and out among the trees, which in some places are so close together that the sun is not visible through them.

At 2 P.M. we reached the third ford, which was deeper than any of the others. The water was over the lower edge of the saddle flaps, and the river-bed was somewhat stony. The breadth of the river was here about 25 yards.

After going another half verst we again had to cross to the right bank of the Shakh-Dara. This time the ford was shallow and easy, for the bed was smooth and hard and with no stones. After this the road passes chiefly through places covered with large stones or along narrow cornices, where one has frequently to quit one's stirrup for fear of being brushed out of the saddle against the cliff, and finally rises steeply along the solid rock face, on which here and there steps have been cut out, while in places the narrow path is widened by means of so-called "balconies," which are merely trunks of trees fastened to the rock by every device imaginable.

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Thus we had not succeeded in preventing the Afghans from crossing the Panja, and consequently it behoved us to be prepared for any and all eventualities. And we had not long to wait.

On the 27th July at 7 A.M. we moved forward. After crossing to the right bank of the Drum river by a fairly strong bridge, and then after some three hundred yards crossing by another bridge to the left bank of the Shakh-Dara, we began to ascend steeply and then reached a small plateau about 150 feet above the bridges which was covered with stones. Further on a still steeper and much longer climb. Road there was none, the narrow path is constantly lost, and there is then no sign of any way. After a few minutes' halt on the plateau to get our breath, we tackled the third part of the ascent; here we had to encounter numerous avalanches of small stones, and also to cross stone shoots, which unable to bear the weight of men and horses went slipping away under one's feet; while in other places we came across steps cut out in the solid rock, up which we had to climb as if up a ladder. No one however who has not been here can have the faintest idea of the actual state of this so-called road, for it is impossible to give an adequate description of it in words. The last part of the road we were forced to do on foot, for riding was quite out of the question, for a single false step on the part of the horse and one would have gone to glory.

The climb on foot was most trying, and one had to stop every five steps or so to take breath. The best way of climbing in these places is to send one's mount on in front, and then catch hold of his tail. If the horsemen found it difficult to get along, it is easy to imagine how far more difficult it was for the men with loads. The pack animals had to be constantly unloaded and reloaded, and the latter operation, when the path was of the narrowest with a cliff on one side and a steep khud on the other, was hardly an easy one.

At a  $\frac{1}{2}$  to 10, absolutely done up, with my throat like parched leather, covered with perspiration and trembling from fatigue, I at length reached the top and sat down to take a well-earned rest, and to look at the road we had come up by.

After resting some time we continued our journey along an almost level plain, and we soon reached the commencement of the descent to the river Shakh-Dara, at the place where from the south the river Bajan-Dara falls into it. This descent is, if possible, steeper than the ascent we had just made on the other side, and it goes down from a height of 1,000 feet above the valley. This time however we had to descend, and therefore continued the march on foot without much difficulty along the path which had been moreover considerably improved by some Tajiks who had been sent out for the purpose with picks and shovels from Seij.

Having reached the bottom, we encamped among some huge poplars at the bottom of a deep ditch, surrounded by high rocky banks, which was called "Kara-Dange." We were surrounded on two sides by the Shakh-Dara and its tributary the Bajan-Dara, while on the third side was the steep rocky declivity down which we had just

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All round us was the most absolute silence, although we knew that in the Kishlak Aziz Khan's family and brother were then living.

Owing to the proximity of the Afghans, it was decided that we should all march with the baggage, and while waiting for the latter to come up, I busied myself with a thorough inspection through my glasses of the Kishlak and the surrounding country.

The Kishlaks of the Shugnis are generally formed of only a few huts, which are widely scattered, each of which is surrounded by fields belonging to the hut. Each family, which is usually composed of the father, the mother, and several married brothers lives in its own separate farm. The huts of the Tajiks are made of stone cemented together with mortar, and are more like cattle sheds than dwellings of human beings. This resemblance is further enhanced by the fact that there are no windows in the huts, while the doors are almost always very small, rudely hewn out of planks. Light is obtained through a four-cornered hole in the roof, which can be closed by a shield; this hole serves the further purpose of an outlet for the smoke from the hearth, which is made by one of the walls of the hut. This hole is called the "ruuz." In consequence of the absence of windows the Tajik huts are dark and damp, and leave much to be desired from a hygienic point of view. Furniture there is none, its place being taken by wide benches along the walls of the hut. On these benches the people sit, sleep, eat, drink, etc. The vast majority of the Tajik huts have not a very attractive appearance, although some, like Aziz Khan's hut, for instance, are elegantly furnished, with carved wood-work, smoothly plastered walls, adorned with numerous niches, which besides being ornamental serve for holding the plates, dishes, and other household goods.

Stables, cow houses, granaries, etc., are usually placed alongside the dwelling huts. One should not forget to mention, too, those very original buildings called "topkhanehs," in shape like a four-cornered tower, in which the inhabitants of the Kishlak used to take refuge in former days when attacked, and where they waited either for reinforce-

ments, or else until the enemy, tired of trying to starve them out, retired. Similar topkhanes are met with all over the valley of the Shakh-Dara, as also in the Gunt valley; in the latter indeed there is a regular fort, called Chartym, which is formed of a group of seven of such towers. These topkhanes were usually built on some inaccessible spot, such as the edge of a precipice or the summit of a hill, so that they generally fulfilled their object, for in the absence of artillery they were practically impregnable being built of stones, which were held together by layers of beams. The only means of getting into these topkhanes was by means of a small hole which was left high up in the wall, and to which access could only be obtained by means of a ladder, which was then drawn up after them. The defenders used to fire at the attackers through loop-holes, and sometimes even over the top of the walls. Round the village of Sendip were several such topkhanes along the crest of the hill, on whose sides were buildings and ploughed fields.

Soon the head of our baggage train showed at the mouth of the gorge, and at 8 o'clock we moved forward. After passing the village of Sendip, the road descends steeply to the banks of the Shakh-Dara, and then passes through a broad plain, which is somewhat swampy. Here the trees grow so thickly, and their branches are so intertwined, that in places it is just like riding through a covered corridor, formed of green branches. Opposite the Kishlak of Denkent the plain comes to an end, and the road crosses a fearful stone shoot, formed of small sharp-pointed stones, which slide away under the weight of the baggage animals. About 2 P.M. our party, after passing the Kishlak of Barvooz, drew near the Kishlak of Vez-Dara, where we determined to halt for the night. It being yet early, we decided to halt the baggage and infantry here, and while they were settling down to go on to the Fort of Rosh-Kala, in which, according to the reports of the Tajiks, there was an Afghan detachment of some 120—150 infantry and a few cavalry.

According to the Tajiks, it was not far to Rash-Kala, and we hoped therefore to return soon. As a matter of fact, however, it was past 4 P.M. before we reached the top of the ridge, whence from a small topkhaneh we sighted Rosh-Kala. We had not yet passed the topkhaneh when there sounded on our ears the melodious sound of a signal, somewhat like the signal of our own cavalry scouts, which was followed almost immediately by a volley from the opposite bank of the Shakh-Dara; and then commenced an independent and rather frequent fire, opened on us by the Afghans from behind a stone breast-work which they had erected on the right bank. Evidently they had well measured the distances beforehand, for the bullets fell with wonderful precision on the footpath along which we were going. The marvel is, however, that, despite the shortness of the range and the largeness of the mark presented by our group of horsemen, not one of us was either killed or even wounded.

For many reasons, not the least of which was the strict command we had received that on no consideration whatever were we to resort to the use of firearms, we decided to beat a retreat to our camp, and

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we accordingly began to retire. At the foot of the hill we were met by our infantry, who, having heard the sound of the firing at Vez-Dara, had doubled out to our assistance. We soon reached our camp, and took up a position ready to defend ourselves.

The position of our reconnoitring party on the night of the 28th July was none of the best, and was not free of danger. We were 8—10 versts only from an enemy some five times more numerous than ourselves, of whose hostile intentions towards us we had just had such unpleasant proof. The Pamir Post, the nearest place from which we could obtain reinforcements, was some 300 versts distant; we had not yet had time to acquaint ourselves with the surrounding country, and our position, although a fairly strong one and difficult to rush, was not fortified; of the intentions of the Afghans towards us we had the most contradictory reports, and, finally, we had not the means sufficient for the defence of our bivouac, for we had but twelve infantry and twenty cossacks, and consequently were not guaranteed against even a sudden rush on the part of the Afghans, who might easily creep up close to our bivouac under cover of the stones.

Having told off the officers for watch, put outposts, and sent out cossack patrols, besides posting some Tajik posts, as the Tajiks expressed their willingness to help us in every way possible, we lay down to rest.

We passed a most restless and unpleasant night. Next morning we fortified our position to the best of our ability, and did what we could to discover the intentions of the Afghans, but all the same our prospects were not much brighter, and there was always the possibility of being rushed at night. How serious was the position of affairs may be appreciated from the fact that the Afghans got to within  $1\frac{1}{2}$ —2 versts of us, frequently exchanged shots with us, and were only prevented closing in on us by the excellence of our 3-line rifles, with which our infantry were armed.

From the 28th July onwards we passed many anxious days, and more particularly anxious nights, as we lived in constant dread of an Afghan attack, which their superiority in numbers must have made fatal to us. Although the reinforcements sent us were most acceptable, all the same we did not feel secure till 13th August, *i.e.*, 17 days after we were first attacked, when General Yonof arrived with detachments of infantry and cossacks.

On the following day the Afghans, having heard of the arrival of our reinforcements, hastily withdrew very early in the morning, first to Rosh-Kala, and then to the left bank of the river Panja, to the fort Kala-i-Bar-Panja, where they were stationed when we first arrived in Shugnan.

The Afghans when retiring had destroyed the bridge over the Shakh-Dara, by Rosh-Kala, and as the water was too deep for fording, we had perforce to wait till by the exertions of the Tajiks the bridge had been restored, when we crossed and joined our reconnoitring party which had gone down the Gunt valley, and had been held up at the Kishlak of Rivak by the Afghans; this was not, however, till 20th August,

The further progress of the detachment down the Shakh-Dara valley was through more and more cultivated spots, with a comparatively dense population. Everywhere we came across cultivated fields, many of which had been burnt by the Afghans or trodden down wantonly in revenge for their owners having thrown in their lot with us. We also came across many houses that had been burnt down, and generally there were signs of the recent stay here of the Afghans.

The fort of Rosh Kala, near to which the detachment crossed to the right bank of the Shakh-Dara, is built on a high cliff. The southern face of this cliff, which overlooks the river, is not only perpendicular, but is even overhanging, and is some 300 feet above the surrounding country. From this side Rosh-Kala is absolutely impregnable. On the eastern and western sides also the approach is most difficult; but on the northern side, which faces the mountains on the right bank of the river, it appears more accessible, against this however must be set the fact that the walls here are massively built of stone, and their height is greater.

The rock on which stands the fort of Dosh-Kala was the place of punishment of the last of the autocratic rulers of Shakh-Dara, Mir Adam Bek, and his numerous adherents, who for so long maintained their independence against the ruler of Shugnan, Abdur Rahim Khan, by whose orders the unfortunate men were thrown from the top of the rock on to the stones below.

In Rosh-Kala there are large numbers of huts for men, horses, and stores. Hence the Afghans had been able to make themselves perfectly comfortable while besieging us, and if only we had been able to forestall them, there we could easily have held our own.

For miles the whole of the surrounding country is visible from this rock, and the kishlaks, laying picturesquely scattered along the hill-sides on both banks of the Shakh-Dara, look like little dolls' houses.

The nearer we approached to the mouth of the Shakh-Dara the more cultivated and populous became the country, and the easier became the road, and it was easy to see that the latter had been "made."

After the junction of the Gunt and Shakh-Dara the stream is called the Kharogh, which has however only a length of some 8—10 versts, and then it flows into the Wakhan river, and thus forms the "Ab-i-Panja."

The valley of the Kharogh is one long thickly cultivated field, the various portions of which belonging to various proprietors are separated from each other by small stone walls. In order to reach the right bank of the Kharogh, we had to cross the Gunt by a bridge which was some few hundred yards above the junction of the Gunt and Shakh-Dara streams.

Here we were joined by the Gunt reconnoitring party, and we camped together on a large plateau, in various small gardens, about 3—4 versts from the mouth of the Kharogh, where we stayed till 15th September, waiting for orders. The time was spent in making a

thorough reconnaissance of the neighbouring country, of the roads down the Panja as far as Roshan, and in visits to the ruby mines, which however we found much over-rated. We also made ourselves acquainted with the mode of life of the Tajiks, the strength of their population, etc.

Our camping ground in the valley of the Kharogh was all that could be desired, and if at some future time it is considered desirable to locate a permanent garrison in Shugnan, no better spot than this could be found for it; it would, however, if a fort has to be built, be better to select a site somewhat nearer the junction of the Gunt and Shakh-Dara, than which no better site could be found in all Shugnan.

At some 5—6 versts down the Panja, on the left bank of that river is the fort of Kala-i-Bar-Panja, the capital of Shugnan, still famous as Ak-Kurghan, so called from the white colour of the rock on which is perched the wall of the fort which faces the river. Both this wall and also almost the whole of the fort is perfectly visible from the right bank of the Panja, and is not only open to gun fire but likewise to rifle fire from the hills on the right bank; consequently the importance of the fort may be said to be *nil*.

On the right or Russian bank of the Panja there are some 14 kishlaks. The whole place is fairly thickly populated, and the people are pretty well off. The climate here is so mild that even grapes are grown, so that the toils of the husbandman are rewarded by nature even bountifully.

A nearer acquaintance with the Tajiks, their manners and customs, made one feel the deepest sympathy for them, in all the troubles and difficulties they had undergone, and one could only wonder at the fact that, notwithstanding all their trials and persecutions, they had not only not vanished off the face of the earth, but had even managed to preserve pure and intact their own peculiarities.

As it was finally decided not to leave in Shugnan for the winter even the smallest garrison, on the 15th September our detachment moved back along the valley of the Gunt. We were followed by a crowd of Tajiks with their families. They were compelled practically to forsake their homes, as they would otherwise most certainly have been severely punished by the Afghans for their sympathy with the Russians.

The general character of the road up the Gunt valley is almost identically the same as that of the Shakh-Dara, except that in the former the stream is somewhat deeper and broader, and fording is impossible; consequently the inhabitants have built themselves bridges in several places.

We soon reached the Koi-Tezek pass, which brought us on to the inhospitable Pamirs, and on 24th September we reached the Pamirski post.

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